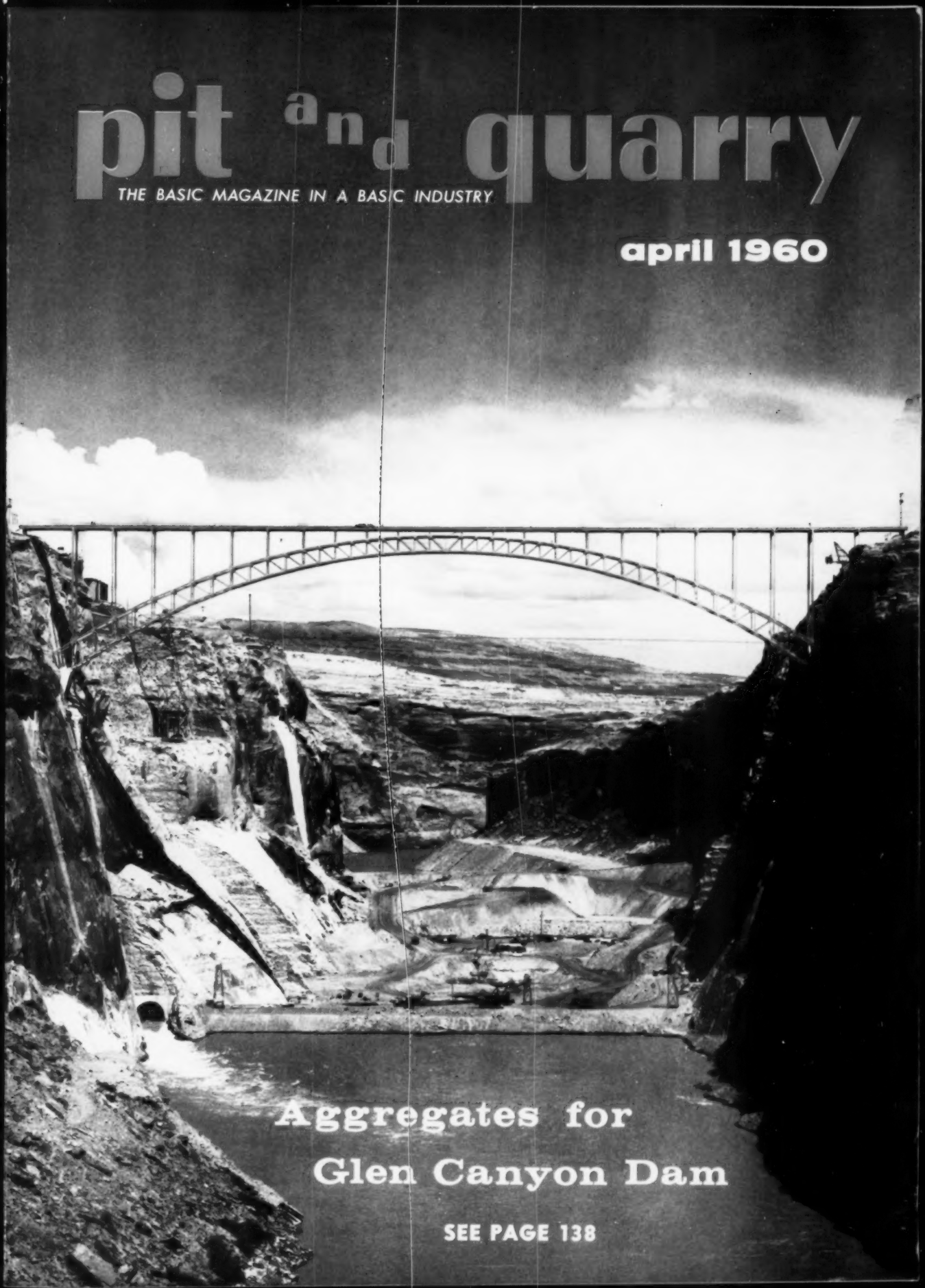
pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

april 1960



Aggregates for Glen Canyon Dam

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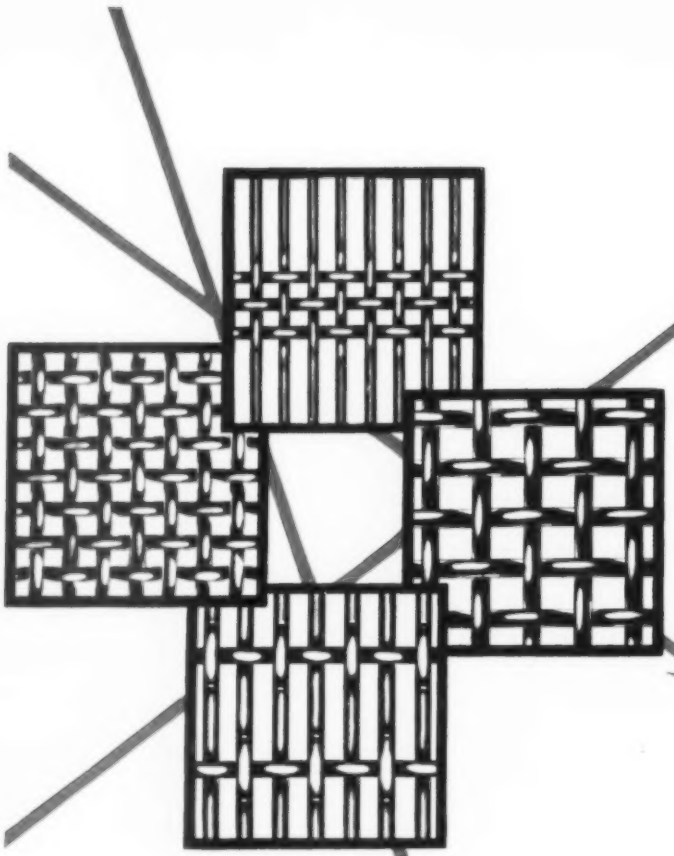

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Wire especially alloyed for super hardness and ductility guarantee extreme resistance to abrasion and fatigue . . . tighter, more rigid weaving plus machine leveling insure flatness and retain accuracy of openings . . . precision-applied hook strips permit installation under higher tension to prevent buckling, distortion and breaking.

Be specific when you order—specify L-S Screens by name. They cost no more than ordinary screens but give up to twice as much service. *Write for Condensed Screen Reference Catalog.*

IMMEDIATE SHIPMENT—most weaves and sizes

LUDLOW-SAYLOR

WOVEN WIRE SCREENS

Ludlow-Saylor Screens and Wire Cloth can be furnished in any steel including SUPERLOY high carbon, LUDLOY oil-tempered, stainless or other alloys; Monel, bronze, copper, brass or any metal that can be drawn into wire.

FOUNDED 1856

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BIRMINGHAM 512 N. 18th St. CHICAGO 6761 West Grand Ave. DENVER 1530 Carr St.
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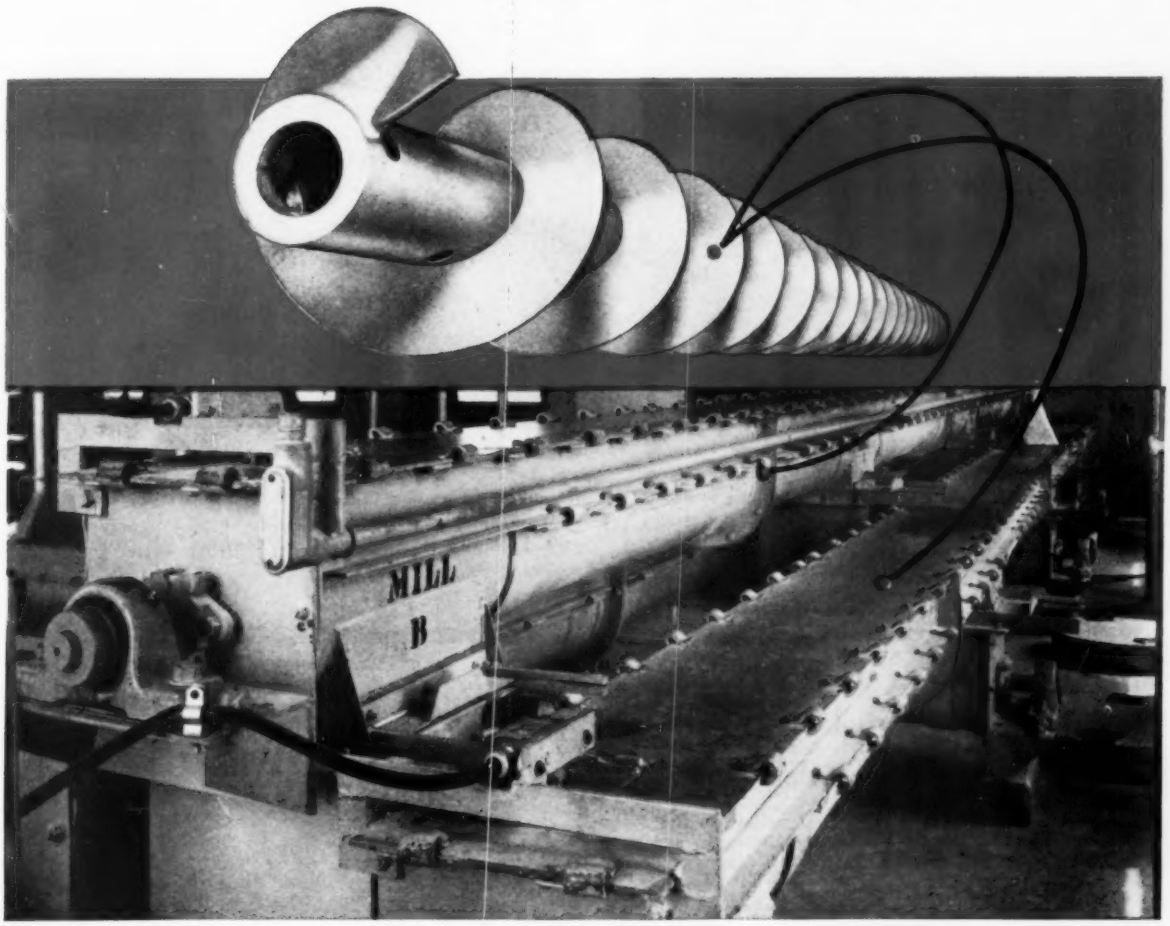
Enter Cover 2 on card, page 169

Why a system of LINK-BELT screw conveyors

FITS LIKE A GLOVE AND WORKS LIKE A CHARM



- **Thorough engineering analysis of all conditions**
- **Full responsibility for satisfactory performance**
- **Unbiased selection from industry's most complete range of components**
- **Expert field erection**

With Link-Belt, screw conveyor engineering includes far more than just supplying a suitable product. All related aspects of your production are considered—including prior and subsequent handling, plus integration with other equipment. And because Link-Belt handles all details from specification to erection, it means a better-working system with less work for you.

Continuous product improvement and development by Link-Belt has produced industry's widest range of components for screw conveyor applications—various types of flighting, gates, troughs, drives . . . plus a new line of ball and roller bearing equipped accessories.

Link-Belt specialists will work with you to determine the feasibility of adapting screw conveyors to your operation. Call or write your nearest Link-Belt office for full details. Ask for Book 2989.

LINK-BELT

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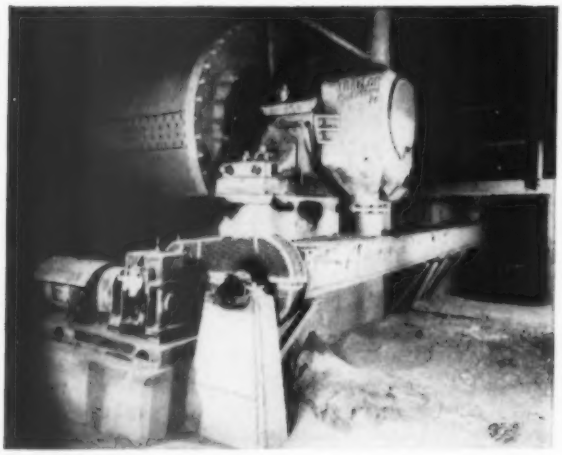
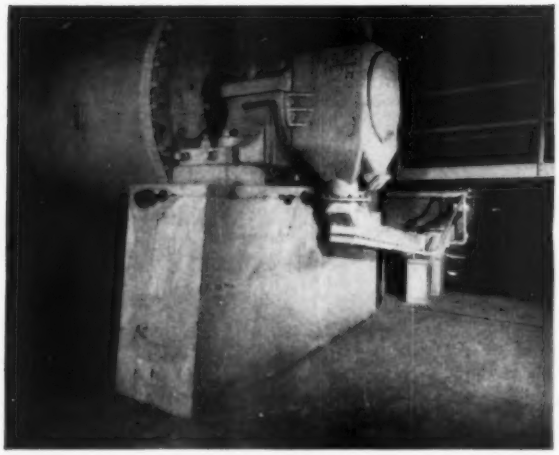
The Arithmetic of Materials Handling



BEFORE: **Dirt, noise and mechanical breakdown** were constant problems in this cement plant, where two mechanical conveyors were used to collect raw materials. A 5 h.p. motor driving auxiliary equipment wasted valuable space and power, required frequent maintenance. Spillage clean-up wasted costly man-hours.



AFTER: **Clean, simple, quiet.** Notice the difference two 8" F-H Airslide® fluidizing conveyors have made. No dangerous moving parts. Nothing to lubricate. Auxiliary equipment and foundations are gone. Power needs are now only ⅛ of previous needs. Fluidizing saves wear and maintenance.

AIRSLIDE® Fluidizing Conveyor

minimizes material loss . . . maintenance . . . moving parts

If you are now handling dry, pulverized materials, the F-H Airslide Fluidizing Conveyor can help you stop noise, and air-pollution, as well as speed flow and reduce maintenance cost.

Simplicity Itself

F-H Airslide conveyors fluidize dry, pulverized materials with low pressure air.

These materials literally flow at high speed, down the inclined conveyor. Power requirements are small.

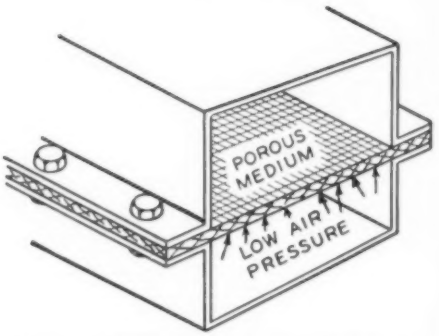
Flexibility, Low Cost

For unlimited applications, Airslide conveyors take up little space, and can be used singly and in combination with other Fuller pneumatic conveying systems. The movement of fluidized material can be around corners, between floors, through walls—nearly any conveying distance.

Better Housekeeping

Can Fuller conveying systems help eliminate your housekeeping problems—cut your maintenance and handling costs? Write today, outlining your problem in handling dry, finely-divided materials. Fuller will gladly make appropriate recommendations.

"Pulverized Materials Flow Like Water!"



FLUIDIZING PRINCIPLE: Porous supporting medium divides conveyor section into two "compartments". Dry material flows down inclined conveyor, fluidized by low-pressure air entering beneath porous medium.

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PIT and QUARRY

APRIL 1960
VOL. 52 No. 10

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For continuous thru-put and inventory data—W-C CONVEYOR-SCALE SYSTEMS

With a W-C Conveyor-Scale System incorporated in your process scheme, you can have up-to-minute thru-put data at any point from incoming transfer to inventory stock-pile. This data, expressed in terms of weight per unit of time, can be totalized for inventory records, process programming, or other manufacturing and accounting functions.

W-C Conveyor-Scale Systems can be supplied for flat or trough-type belts, fixed or variable speed, in capacities from 20 to 1000 tons per hour for new or existing conveyor installations. Each is a job engineered system employing standard, unitized components. As a result, you get a "custom" system at an "off-the-shelf" cost.

Typical applications include: Controlling feed and blending of slag, limestone, caliche, rock, etc. to obtain required formulation.

Write for new Bulletin 60

W-C

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Div. of CompuDyne Corp.

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FOR ROCK DIGGING

Where it's Toughest!

A few months ago this area was uncleared land. In June, this big Northwest 80-D, 2½-yd. Shovel started removing overburden for the Ramona Stone Co. of Marion, Ill. Today, it is an active quarry and destined to be the largest limestone quarry in Southern Illinois. The daily production runs around 2,500 tons. The 80-D loads 12-yard Payhaulers and keeps a 36 x 45 Cedarapids Breaker busy.

It takes a real Rock Shovel to open up and make an operation like this successful. Northwest Shovels are *real* Rock Shovels. They bring a combination of advantages that have made them outstanding in handling heavy rock work and excavation. They make hard digging easy and easy digging easier. Machinery Bases and Machinery Side Frames are heat treated, cast steel to take the shocks of digging. The Feather-Touch Clutch Control makes operation easy and yet retains the feel of the load.

The Helical Gear Drive, the Cushion Clutch, Uniform Pressure Swing Clutches and the Northwest Dual Independent Crowd not only play a part in better output but they combine to assure performance when it is needed.

Your Northwest is always ready to go. We hear it everywhere, and Northwest users will tell you so. We'd like to tell you more about Northwest advantages. *Ask for a catalog on the size machine you need.*

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street, Chicago 3, Illinois

S-80-101-S

NORTHWEST *Always Ready to* GO

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

engine power
BY CATERPILLAR

Over-all view of Baulne, Inc., plant set up near Weston, Oregon. Plant is shown here producing rock for another contractor on two highway jobs for Oregon Highway Department. The jobs are on the state secondary system and total eight miles.

W. E. Webster (left), superintendent of Baulne plant, discusses the more efficient operation since they repowered electrically, with E. H. Carlson of Byrne Machinery who sold the Cat D397 Electric Set.

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BAULNE, INC., REPOWERS WITH CATERPILLAR ELECTRIC SETS... CUTS OPERATING COSTS AND SET-UP TIME

When Baulne, Inc., of Spokane, Washington, decided it was more economical to repower electrically than continue to use mechanical power at its rock crushing plant, a Caterpillar D397 Electric Set was the first choice. W. E. Webster, superintendent of the company's plant near Weston, Oregon, gave good reason for wanting Caterpillar: "I've been working around Cat Engines since I was a kid. I like the Cat Engines best. They stand up better—they're made better. They've worked better on the jobs I've been on. Dealer service has been good."

To meet the demands for 236,000 tons of rock for base course, top course and plant mix paving on two Oregon Highway Department jobs, Baulne, Inc., produces an average of 260 tons an hour of 1½ inch minus base course rock—maximum production is 290 tons.

Operating expenses can bite heavily into the profits of a high production operation like this one, especially when they include maintenance of several engines and their high fuel costs. With a Caterpillar Electric Set, you not only eliminate these costs but also the maintenance costs of cross shafts, jack shafts and other mechanical power transmitters that slice into your earnings and decrease plant portability.

In addition, you increase your profits through operational savings and get paid for *all* you crush by repowering with Cat Electric Sets.

When you control the rate of feed to your screens from a central location, you can vary the feed to the maximum amount that the screens will handle. In this way, you get full production of whatever material you are crushing, regardless of size, moisture content or density.

Each application for Diesel Engines has special requirements. Your Caterpillar Dealer provides more than 125 engine configurations or he can tailor one to suit you. Ask him to outline the kind of plant you'd have with a Cat Engine. He has one that will give you direct-from-the-flywheel mechanical drive, with a large capacity front-mounted generator for your electrical load . . . the Cat "Two-Handed" Diesel. Nine basic Cat Engines from 50 to over 730 HP and Electric Sets from 30 to over 350 KW—plus all of the engineering data you need to plan the most profitable installation—are available. Call him today.

This is where electrical controls pay off for Baulne, Inc. By equipping the delivery conveyor with an electric motor and controlling it by a switch actuated by a scale beam or by an operator, instantaneous stoppage of belt is obtained, resulting in exact payloads.

Cat D397 Electric Set mounted in trailer parked in off-plant location. Vibration and much of dust can be eliminated with this plan. Dry-type air cleaner of Cat Engines removes 99.8 per cent of airborne dust every hour of service. In heavy dust, pre-cleaner can be used.

CATERPILLAR

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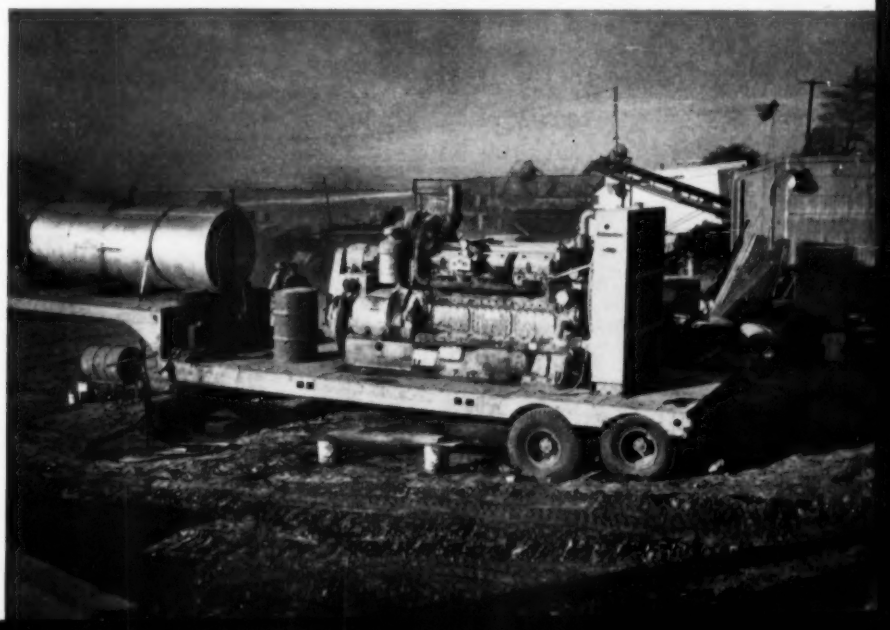
Engine Division, Caterpillar Tractor Co., Peoria, Illinois, U.S.A.



Which is the Best Screen for your job?

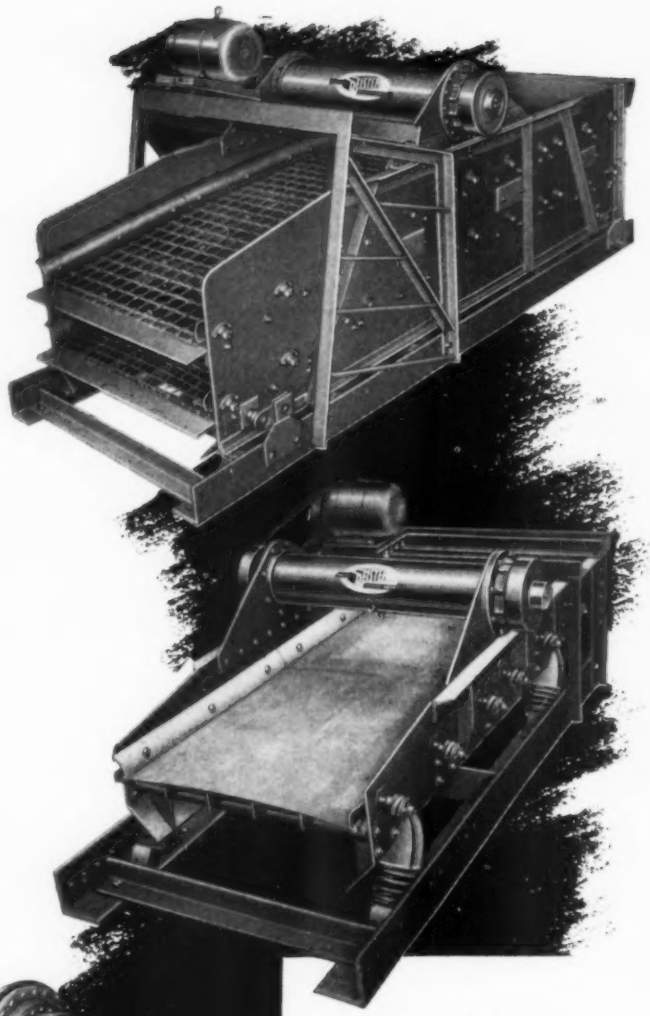
The vibrating screens you select to meet today's extremely competitive conditions must be highly specialized machines . . . designed especially to handle each of *your particular jobs*. And that's why Deister builds screens in four distinct *types* and in a complete range of *sizes*. For example:

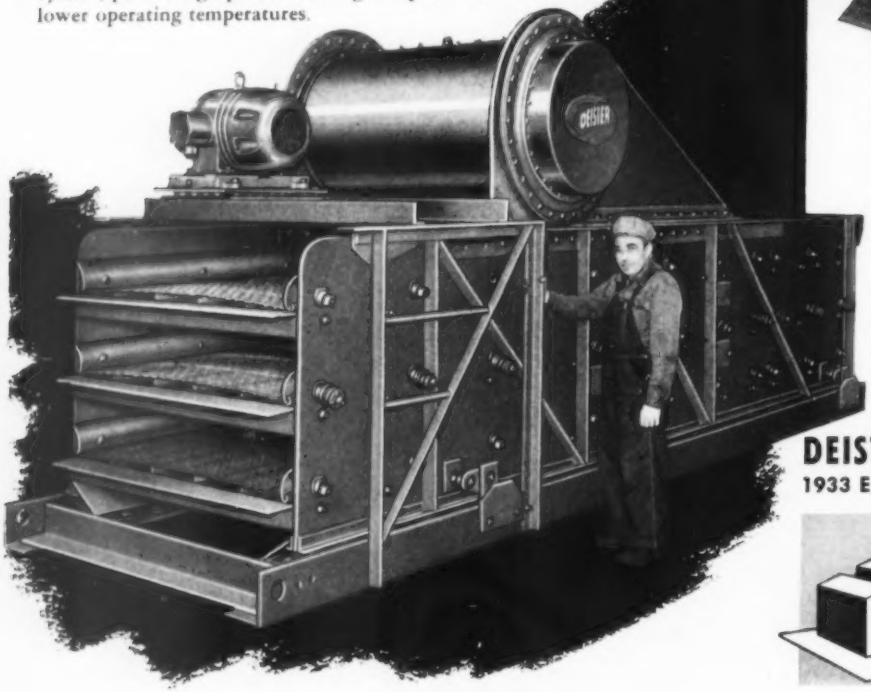
Type UHS. Deister Type UHS Screens are built in a full range of sizes to meet any heavy-duty screening job. Extra heavy-duty types are available for scalping and coarse sizing. The Deister principle of opposed elliptical throw provides maximum capacity and efficiency in sizing. With Deister's exclusive Adjustable Slope Screen Panels, the screening angle of every Type UHS may be adjusted exactly at both feed and discharge ends to meet the specific requirements of your job.

Ag-Lime. Deister Ag-Lime Screens (Type USL) are designed to screen damp, sticky material through medium and medium fine screen cloth openings. They apply intense vibration at a relatively high frequency. For unusual conditions they are available with an Electric Screen Heater and a Ball Tray Deck.

Flat Screens (Type UF). If your plant design requires flat or horizontal screens, or if you need increased tonnage but lack the head room necessary to install larger inclined screens, investigate Deister Type UF Screens. They are also unusually effective for dewatering sand, gravel and stone.

An outstanding feature of *all* Deister Vibrating Screens is Deister's Exclusive Oil Mist Lubricating System, permitting operation at higher speeds and lower operating temperatures.





Top: Type UHS Screens are available in 3', 4' and 5' widths; in 10', 12', 14' and 16' lengths; and with single, double or triple decks.

Above: Type USL Ag-Lime Screens are built in 4' x 8' and 4' x 10' single-deck models.

Left: Type UF is built in 3', 4' and 5' widths; in 8', 10', 12', 14', 16' and 18' lengths; in single, double, triple and four-deck models.

DEISTER MACHINE CO.
1933 E. Wayne St., Ft. Wayne, Ind.

DEISTER

In New Trucks or Old—
EATON INDUCTALLOY AXLE SHAFTS

LAST 3 to 10 TIMES LONGER

Through billions of miles of heavy-duty service, Eaton Inductalloy Axle Shafts have proved their ability to deliver superior performance. Freedom from break-down—more time on the road, less time in the shop—plus thousands of trouble-free miles added to axle life, mean lower over-all operating cost.

Eaton's exclusive method of dual hardening truck axle shafts produces an extremely hard case extending deep into the material structure, and enables Inductalloy Axle Shafts to handle more work and abuse without fatigue failure.

Eaton Inductalloy Axle Shafts are available not only in new axle equipment, but also as replacements for earlier models. Ask your truck dealer for complete information.

EATON INDUCTALLOY SHAFT

ORDINARY AXLE SHAFT

EATON — *AXLE DIVISION* — MANUFACTURING COMPANY
CLEVELAND, OHIO

The JOHN DEERE 840 with HANCOCK SCRAPER

Cuts roadbuilding costs from fill to finishing

No need to tie up a lot of high-cost equipment—the thrifty John Deere "840" Diesel with 7-1/2-yard elevating scraper takes over by itself—without a pusher. Slat-type elevator builds its own heaped loads—breaks up clay for fast hydraulic ejection, even spreads.

Preferred for finishing and street work, too, the unit U-turns within standard 30-foot curbs, and has a transport width of less than 8 feet.

Many contractors have purchased this equipment with the help of the John Deere Credit Plan. For the information you need, consult your John Deere Industrial Dealer through the classified telephone directory, or write direct today.

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INDUSTRIAL DIVISION
3300 River Drive
Moline, Illinois

JOHN DEERE *"Specialists in Low-Cost Power with a Heavyweight Punch"*

Washington News Letter

By S. HERBERT UNTERBERGER

Housing in 1960

IN assessing government policy, there is always great interest in developments in the housing markets because they are hypersensitive to many of these policies. It has recently been observed that the three peak years in housing starts since the war were 1950, when 1,350,000 houses were begun; 1955, when 1,310,000 houses were begun; and 1959, when approximately 1,335,000 houses were begun.

It has been observed that each of these three peak years in housing output occurred in the year immediately following a recession. Moreover, it has been discovered that this development is not so much a result of the fact that housing buyers suddenly appear on the scene after a recession, but rather because loanable funds flow into the mortgage market in unusual volume at that time, partly because there is less demand for business loans and partly because mortgage loan yields at that time compare favorably with yields on alternative investments.

The Prudential Life Insurance Company, which has a substantial interest as a large mortgage lender, has issued the following observation and forecast with respect to housing expenditures:

"Although housing begins the post-recession year at peak level, the progress of the business recovery means that alternative demands for loanable funds will be rising, so that it becomes progressively more difficult to secure enough mortgage money to finance all the homes which builders wish to put under construction. Mortgage money is made particularly tight by the interest rate maximum which Congress imposes on F.H.A. and V.A. loans and which makes these mortgages relatively unattractive to lenders, and interest rates in general begin to rise. The result is that, although the post-recession year normally produces a record volume of residential construction, there is nevertheless a slow downward drift in housing output during the year as mortgage money tightens.

"In January of 1959 housing starts reached a peak annual rate of 1,432,000. Although this rate was temporarily equaled in April, the trend during the year has been slowly downward, with the annual rate falling to 1,325,000 in September, and 1,180,000 in strike-influenced October.

"In 1960 there will be two main factors acting to curb housing starts. First, alternative demands will compete with even greater intensity for the necessarily limited volume of investable funds. Some lenders, particularly commercial banks, will be reluctant to increase further their mortgage holdings at a time when business needs are strong. Second, there is a good deal of doubt that demand for housing in the United States at present will support a continued outpouring of housing units at the 1,335,000 rate achieved in 1959. Most of the backlog in housing demand from the depression of the 1930's and from World War II years has now been met. In addition, the number of persons in the age bracket usually associated with home purchases will constitute a smaller than usual percentage of total population in the years immediately ahead.

"For these reasons, private housing starts in 1960 are likely to remain close to recent levels, probably totaling about 1,200,000. Dollar expenditures on new residential construction are likely to fall about $1 billion below the figures for the full year 1959."

These paragraphs state (more directly than in most other places) that the home construction industry is not expected to share in the general prosperity of 1960, or perhaps even that of 1961. This is true not because this industry is not offering a commodity which people want and need, but rather because it will not be able to compete for financing with other industries subject to fewer legal inhibitions.

More recently a new aspect of the financing situation has come to the fore. It is the effect of the various state usury laws on home financing. Many states, such as New York and others, mostly in the eastern part of the country, have laws which deem any interest charge in excess of 6 percent as usurious. However, there are nine states which permit interest charges up to 10 percent. Rhode Island allows charges up to 30 percent, and three states—Maine, New Hampshire, and Massachusetts—have no usury ceilings at all!

These maximum rates generally apply to home mortgage loans. Now that the interest notes on home mortgage loans are coming close to and in some cases exceeding the 6 percent figure, mortgage lenders are reluctant to place loans in the 6 percent states. As a straight business proposition, there is no reason to do this if they can get more for their money elsewhere.

Accordingly, mortgage money, which is notoriously fluid, is moving to such rapidly growing states as

(Continued on page 208)

ONE TON FOR 6 CENTS...Total Digging and Hauling Cost with a Sauerman

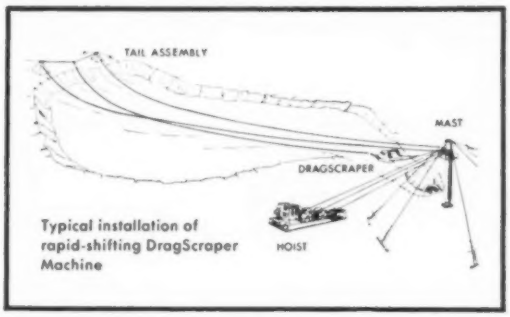
Dig and haul from your high bank, deep pit or underwater deposit direct to plant hopper or stockpile for 6 cents per ton. This cost is based on current job figures for Sauerman DragScrapers operating over average depth and haul distances.

The reason: one man and one machine handle the entire job. You save money three ways over multiple machine methods. Your power costs are much lower. A single operator replaces two or more on your payroll. Your maintenance costs are much lower because only the DragScraper Bucket and cable contact the material handled.

If you are hauling over distances up to 800 ft. or digging under water at depths to 100 ft.—the Sauerman DragScraper Machine is the most economical means you can use.

You can get DragScraper Machines in sizes from ⅓ to 15 yds. to match your tonnage requirements. Write or call about the physical dimensions of your deposit. We'll recommend the proper machine. For general information and detailed data on specific installations request Catalogs A and SG-1.

Plant Operators Are Saving On Power, Labor And Maintenance With Sauerman DragScraper Machines



Typical installation of rapid-shifting DragScraper Machine

DragScraper Bucket deposits load of sand onto grizzly hopper.

SAUERMAN BROS., INC.

634 So. 28th Ave., Bellwood, Illinois
Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent DragScrapers • Slackline and Tautline Cableways • Durolite Blocks

Labor Developments

The Ban on Recognition Picketing

THE amendment to the Federal Labor Law, which Congress passed recently, includes a provision which bars a union from picketing an establishment longer than 30 days for the purpose of obtaining recognition unless, within that period, it has filed a petition with the National Labor Relations Board for an election to demonstrate that a majority of the employees wish to be represented by the union. Previously, many unions, whether they had such majority status or not, would picket the establishment—rather than go through the election and certification procedure—thereby doing it economic damage, until the employer gave in and recognized the union and bargained with it.

Usually, with a picket line outside, truckers would refuse to deliver to the establishment, thereby effectively either shutting it down or doing it substantial harm. Now, through the Federal Labor Law, Congress has said substantially that a union may engage in this tactic for a reasonable time; but that if it fails to win the employer's recognition, it must demonstrate that, in fact, it represents a majority of the employees. After this fact has been established, the employer is required by law to recognize and bargain with the union.

Previously many unions which clearly did not include among their membership a majority of the employees nevertheless continued to picket a particular employer endlessly. They hoped thus to demonstrate to him that he could not escape their influence or, more particularly to other employers, that this was the penalty for refusing to do business

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

with that union. It was this kind of abuse of the right to picket which Congress sought to prevent.

Now that the provision has been enacted, its applicability is being tested in a variety of court actions. For the first time, employers have the opportunity to obtain relief under the federal law. A number have gone into the courts to obtain injunctions to eliminate the picket line in front of their places of business.

Among the first of these cases was that of a printer in California. This case was complicated somewhat by the fact that when the union initially tried to organize the employees in his composing room, he discharged them for taking out membership in the union. He was charged with an unfair labor practice, a decision which was upheld by the National Relations board. When he agreed to take the discharged employees back, he was required to pay them the back pay which they had lost.

However, they refused to come back until he recognized their union. When he would not take them back under those conditions, they promptly put a picket line in front of his establishment, which was maintained for more than 30 days before they petitioned for an election.

The employer went into the federal court and applied for an injunction against this recognition picketing, and the court issued one. In that case the union claimed that it clearly represented a majority of the employees and that it was picketing for the purpose of compelling the employer to cease his unlawful refusal to bargain. Union spokesmen asserted that it could easily be ascertained whether the union represented a majority by counting the number of employees out on strike, and that it was not necessary to go through the procedure of even a speedy election.

The court, in explaining its decision, pointed out that employees might, for reasons of their own, go out on strike and yet, in a secret ballot of election, vote against representation by the union. The court also pointed out that Congress did not intend to treat the existence of an unlawful refusal to bargain on the part of the employer as justification for relieving the union of the necessity for filing an election petition within 30 days of the date it commenced picketing.

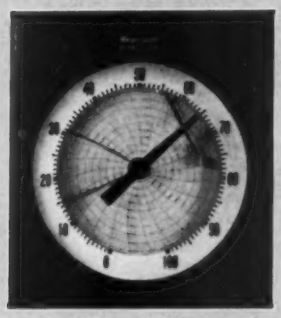
The court stated: "The amendment is consistent with Congress' comprehensive plan to protect the rights of employees and employers, and to stabilize labor relations and to provide for the orderly resolution of disputes over representation of employees by requiring that such questions be settled by a proper tribunal rather than through the coercive activity by the antagonist."

The ruling of the California court seemed sufficiently clear-cut. It took the words of Congress literally and applied them directly. Unfortunately, that was no more than a lower court ruling, and other lower courts frequently come to somewhat contrary conclusions.

A somewhat more flexible rule was enunciated by the federal court in Indiana. This case, too, was somewhat complicated by its history. Some three years earlier the union was certified by a state labor agency, after winning a decisive victory in an election conducted among the employees by that agency. The owner of the business at that time recognized and

(*Continued on page 74*)

◀ TRAVELING ALONG KILN SHELL on steel cable, the *Radiamatic* unit provides continuous temperature measurement.



ElectroniK CIRCULAR CHART RECORDER records kiln shell temperatures and reference points showing position of *Radiamatic* along kiln.

RADIAMATIC RADIATION DETECTOR responds to 98 per cent of any temperature change within two seconds, is automatically compensated for ambient temperatures up to 250°F.

Hot Spot Hunter at Universal Atlas Cement cuts Kiln Downtime 70%

A cement kiln is seldom down for refractory replacement at U. S. Steel's Universal Atlas Cement Division, Gary, Indiana. A *Radiamatic* radiation detector continuously and automatically locates potential kiln hot spots before damage can occur – saving costly, time-consuming refractory replacement and production time.

When temperature-sensitive crayons were used to signal hot spots, a tested kiln was down five times in one nine-month period. In the first six months of operation with *Radiamatic* protection, the kiln was down just once.

The *Radiamatic* unit scans kiln shells along the full length of the hot zone, and works with an *ElectroniK* recorder which records both temperatures and reference points showing position of the detector along the kiln. When temperature reaches a preset limit, a signal light warns the burnerman that a potential hot spot is developing, and he can take immediate remedial action.

Your nearby Honeywell field engineer can give you complete details on how to apply this system to your own kiln. Call him today . . . he's as near as your phone. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

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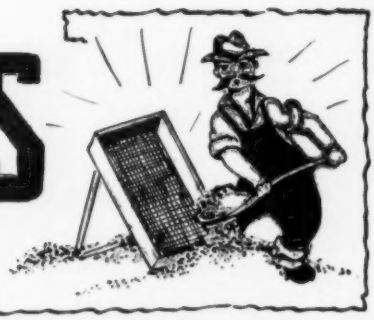
PIONEERING THE FUTURE

SCREENINGS



By RAY L. SMITH JR.

ROCKNROLL, the man said, is nothing more than hillbilly music with shoes on. And with that the younger set will be off like a Russian rocket—right to the moon.

Speaking of the Russians, the Red radio is now boasting of late about a combination potato peeler and cocktail mixer. It can peel three-quarters of a pound of spuds in three or four minutes, make a container of cocktails in 90 seconds, they proudly claim.

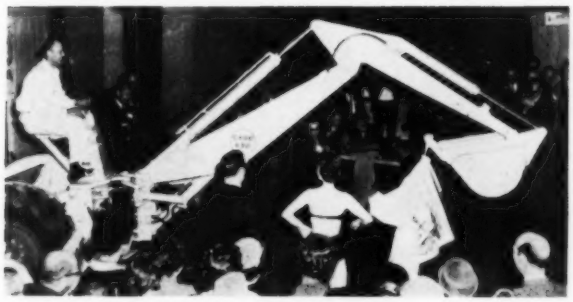
Just what the connection is between peeling potatoes and mixing home brew was not made clear.

American women have had such a gadget around for years.

Over here its called a (groan) husband.

Stripback-hoe

AT THE Midwest Farm Equipment Association Show, the other day, a J. I. Case Utility backhoe undressed an attractive model down to her shoes and panties and bra. Working gently, with smooth precision control of boom, crowd, and bucket, and simultaneuosly adjusting lateral motion with foot pedals, the operator stripped the young lady of her purse, hat, coat and dress, as deftly as a sleight of hand artist. Needless to say, the operator enjoyed his work (see cut) . . . the crowd loved it . . . and



interest was high in the low-cost backhoe (that's the thing with the *straight* lines, Junior!)

Maybe the manufacturer should give heed to the possible implications of this incident. The burlesque stage is long overdue for some fresh approach to the stripping art, and the Case Company technique, executed to the tune of "Take It Off. Take It Off.", might give the boys in baldhead row quite a bang.

Consider, if you will, Hurricane Hips, Blaze Starr, Tee Tee Red, Zorita, Candy Barr, joining up with the Case nominee to demonstrate their glamour act. Note to the Case Company: We'll be glad to donate our services for the purpose of opening direct negotiations with the nation's striptease artists.

Potpourri and Succotash

The reason our dollar bills wear out so quickly is that people are continually passing the buck.

Grade crossings are meeting places for headlights and light heads.

The advantage of being bald is that when you expect callers, all you need to do is to straighten your tie.

The sports car owner's description of the U. S. standard automobile: "It's a 4-eyed, 2-horned, pink and purple ethyl eater."

Sign in a factory: "Look alive—you can be replaced by a button."

It's a tough world for the American business man. Each time he comes up with something new the Russians invent it a week earlier and the Japanese make it cheaper.

A young mother paying a visit to her doctor, made no attempt to restrain her 5-yr.-old son, who was ransacking an adjoining treatment room. But finally an extra loud clatter of bottles did prompt her to say, "I hope, doctor, you don't mind Billy being in your examining room."

"No," said the doctor calmly. "He'll be quiet in a moment when he gets to the poisons."

During the lunch-time rush crowd, many of the restaurant customers shared their tables with strangers. The very proper spinster selected a seat next to an attractive young office girl. The girl finished her sandwich and coffee, then settled back and lit up a cigarette. The older woman controlled herself for a few minutes and then snapped, "I'd rather commit adultry than smoke in public." "So would I," said the girl, "but I only have an hour for lunch."

People who "don't know what to do with their hands" are usually bridge players.

Sweet little Emily Rose,
Was tired and wanted repose,
But her brother named Clare,
Put a pin in her chair,
And sweet little Emily Rose.

A public works inspector known for his fault-finding, was checking a new road under construction. The shoulders were too narrow, he started in, the crown too low, and the ditches had been dug too deep. The foreman listened to him grimly, then asked: "Is the length okay, sir?"

Thor

Everything you want in Crawler Rock Drills...

and more!

Thor's all new Crawler, Model TR-5, outperforms wagon drills three to one and every other crawler by quite a margin. One man operation. All-hydraulic controls completely flexible to maneuver mast and boom into any drilling position. Thor TR-5 is equipped with Thor model 140 4½" drifter. Two 8 h.p. rotary air motors propel the compact drilling machine. Ask your Thor "Red Tool" distributor to show you the movie of this remarkable crawler. Thor Power Tool Company, Aurora, Illinois. Branches in all principal cities.

Thor POWER TOOLS

entirely NEW ...ANOTHER TELSMITH SCREEN

TELSMITH

For years Telsmith inclined screens—Pulsators and Vibro-Kings, for scalping and finishing—have proved their efficiency and low cost screening all over the world.

And now, the NEW TELSMITH HORIZONTAL SCREEN with

- **new space-saving compactness**
- **new thorough dewatering**
- **new sizing efficiency**
- **new high capacity**
- **new savings in operation and up-keep**
- **single, double, and triple deck; all sizes**

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"We particularly like the snappy action and control accuracy of the TD-25's front-mounted winch," report the Walls Brothers, Wolf Ridge Coal Co. Their "25" has a key job, helping strip 35-ft. earth, shale and sand rock overburden from a 4-ft. seam of coal.

"THIS NEW TD-25 REALLY HAS IT for overburden stripping"

C. M. and Reid Walls,

"We have had eight years of fine service using International TD-24's," report the Walls Brothers, for Wolf Ridge Coal Company. "Our faster and easier starting new TD-25 really has it for mountain overburden stripping operations.

"The '25's' turbocharged diesel engine governs instantly to load increases, giving the power to carry full blade loads right on through without lug-down. The TD-24's, and now the TD-25 have proved to us that the live power-turning feature moves more overburden, and gives top operating safety."

Of all king-sized crawlers, only the new 230-hp International TD-25 has Planet Power-steering. This

Another duty of the TD-25—shattering coal with the two-standard Ateco ripper to size the coal and speed load-out. "We've used International TD-24's since '51 with continuous operation, good service, minimum repairs," add the Walls Brothers.

Wolf Ridge Coal Co., Oliver Springs, Tennessee

is the only planetary system engineered and located to give you the dual advantages of "live track" power-steering; plus on-the-go, Hi-Lo power-shifting that does away with steering clutches.

Planet Power-steering eliminates load-limiting "dead-track drag"—gives you full-load pull-power on turns as well as straightaways. And Hi-Lo power-shifting does away with time-wasting "gear-shift lag"—gives on-the-go matching of power to load, for full-speed cycles.

Rip-snorting turbocharged power

Press the direct-start button, to command the "25's" rip-snorting, free-breathing diesel horsepower! Dual valving of the "25's" high-torque DT-817 engine provides for peak turbocharging efficiency—to deliver full-rated performance from sea level to timberline!

Prove what it means in bonus capacity to get the double-barreled advantages of power-steering and power-shifting—in a finger-tip-controlled crawler with DT-817 diesel wallop! Measure the extra value of getting years-proved Planet Power-steering (along with Hi-Lo power-shifting) as designed-in, built-in basic standard equipment. Compare performance—see what's behind TD-25 ability to outearn king-sized clutch-steered crawlers up to 50% on overburden removal, land-clearing, high-walling and other tough mine and quarry jobs. Let your International Construction Equipment Distributor demonstrate!

Here's your 76-page cost and production estimating book—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, anywhere! Yours for the asking from your International Construction Equipment Distributor!

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International® Construction Equipment

International Harvester Co.,
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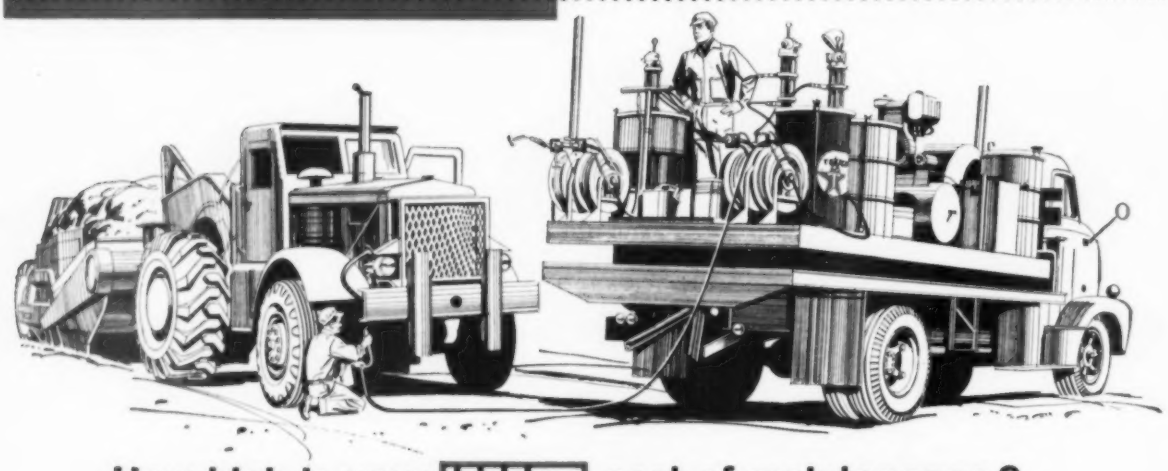
LUBE LOGIC

Six tips to

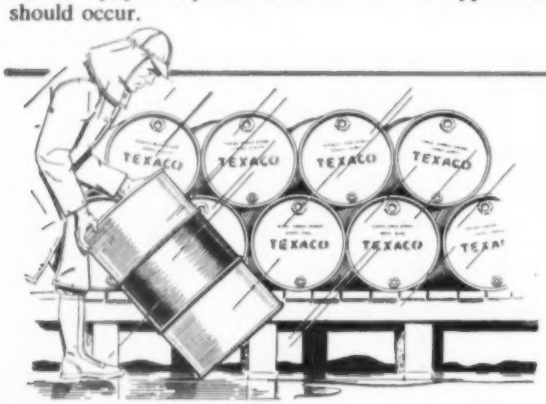


How high is your hidden cost of maintenance?

You may not realize how many extra maintenance dollars you spend when you keep many different lubricants on hand. (Six are often all you need to cover all major maintenance.) You pay extra for inventory. You pay extra for storage and handling. It costs you more in paperwork to order. And you'll have to figure the wasted cost of equipment parts and downtime if misapplication should occur.

The Texaco Lubrication Plan helps you reduce or even eliminate these hidden costs. That's because it provides the minimum number of *proven* multi-purpose and special lubricants, tailored to your job requirements.

You'll do yourself a favor when you check with a Texaco Lubrication Engineer. He'll carefully plan your lubrication needs—then follow them up to see that your lubrication problems are taken care of fast.



The inside story on outside storage

You're short-changing yourself if you skip these simple precautions: drums stored outdoors should be placed on their sides. When stored on end, expansion and contraction through temperature changes can suck in rain water that collects on top of the drum.

Want to warm up lubricants that have become stiff from cold? *Don't* heat them with an open flame. You might melt the sealing compounds, and the drum will leak. You might also damage the product with too much heat in one spot. Put the drum indoors for a while before using.

Here's how to handle cylinder cavitation erosion

High pressure cooling systems in use in most supercharged diesels are subject to coolant aeration. This aeration can cause cavitation, leading to serious cylinder liner corrosion-erosion, unless a rust preventive is added to the water. A good antifreeze (like Texaco PT antifreeze) will do the job in winter—but in summer a 1% to 2% solution of Texaco Soluble Oil C will do a fine job. (Remember to flush out before you add antifreeze again.)

cut maintenance costs

OIL GAUGES SPEAK A LANGUAGE ALL THEIR OWN

Look to your oil gauge pressure for clues to a variety of potential engine ailments. For example:

LOW OR NONE

1. Oil pump pickup stuck high.

LOW

1. Clogged oil pump screen.
2. Excessive main, con-rod, camshaft or rocker-arm bearing clearances.
3. Clogged full-low filter, if by-pass isn't working.
4. Excessive dilution of oil with fuel.
5. Enlarged squirt holes.
6. Loose connections or cracks in oil line.

LOW OR ERRATIC

1. Faulty oil pump.
2. Restriction in oil pan, or oil too viscous to keep oil pump intake supplied.

LOW OR HIGH

1. Faulty gauge.
2. Ineffective oil cooler depending on type, may keep oil too cold or provide insufficient cooling.

HIGH

1. Oil with viscosity too high for climate.
2. Sludge and contamination in the oil.
3. Clogged oil passages on the pressure side.

HIGH, LOW OR ERRATIC

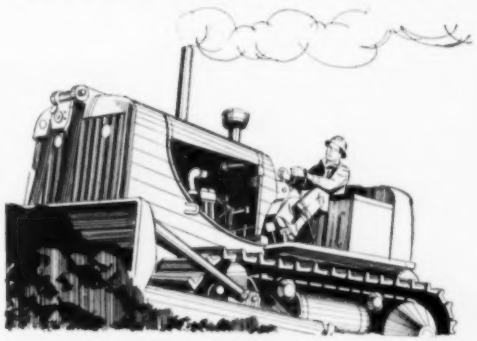
1. Improper setting or failure of pressure relief valve.

ERRATIC, LOW, THEN NONE

1. Crankcase oil level just at or below oil pump pickup.

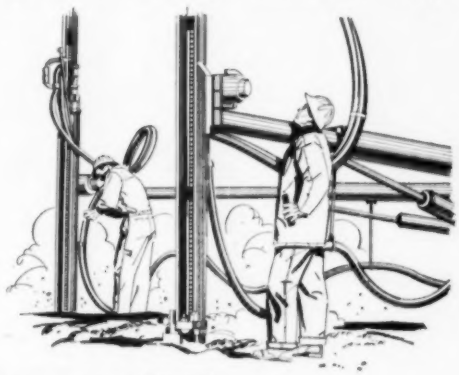
NO MOVEMENT OR DELAYED ACTION

1. Clogged line to gauge.



Don't let engines foul up!

If the fuel injector on a diesel drifts off or "dribbles," incompletely burned fuel will contaminate the crankcase. The result will be plenty of smoke—and probably engine trouble. The injector should be fixed immediately—but if it can't be, start shortening drain periods to remove the damaging oil-fuel mixture. Also, use an oil with full detergent and dispersion properties to keep other undesirable products out of the engine.



New product for rock drill couplings

Actually, it's an old friend, Marfak Heavy Duty #2, in a new application. According to the raves from customers who've tried it, the lubricant works better on rock drill couplings than anything they've ever used.

TEXACO LUBRICATION ENGINEERS

Every month or so we'll bring you a batch of "sleepers"—little angles, so easy to overlook, where big savings in time and money can be made. But month in, month out, your local Texaco Lubrication Engineer is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

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24" conveyor belt carrying rock from crusher rolls.

"Only 'U.S.' Belts hold up in handling crushed rock,"

says vice president of plant

"We use hundreds of feet of 'U.S.' Belting", says G. H. Lindekugel, Jr. of G. H. Lindekugel & Sons, Mitchell, So. Dakota. "Performance is extremely good. Our operation consists of highway construction and pit deposits. We average 600 tons per hour at our crushing plant. U. S. Rubber Belts work 12 hours a day, 6 days a week, carrying rock and gravel. We have no complaints. *Couldn't find any other belts that could handle crushed rock for any length of time.* 'U. S.' belts have been three years on the job, are in good condition".*

It's performance such as this that has made U. S. Rubber the largest manufacturer of belts.

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When you think of rubber, think of your "U. S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.

*This installation was handled by "U. S." Distributor W. S. Nott, Minneapolis.

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News of the Industry

Southern Pacific Milling Purchased for $4.5 Million By United Industrial Corp.

Substantially all of the capital stock of Southern Pacific Milling Company, Ventura, Calif., was purchased by United Industrial Corporation, of Los Angeles and New York. The acquisition reportedly cost $4,500,000.

Southern Pacific Milling's growth has paralleled that of coastal California, and since 1885, the S.P. trade-mark circle has been a familiar symbol in that area. The company is no longer in the grain-milling business, but its 12 locations serve Ventura, Santa Barbara, and San Luis Obispo counties with sand, gravel, ready mixed concrete, asphalt-plant mix, and related building products.

Tyler Co. Enters New Field With Sand-Gravel Installation

One of the newly established industries in the Louisville, Ky., area is the sand-and-gravel plant built by the R. B. Tyler Company of that city. This installation is a 250-t.p.h. plant. Tyler also operates two ready-mix plants, an asphalt plant near Louisville, and contracting operations in Louisiana, Florida, Tennessee, Mississippi, and Kentucky.

The sand-and-gravel business was formed to assure materials for the company's own needs.

Harry T. Campbell Sons' Corp. Becomes Flintkote Subsidiary

Effective March 18, an agreement for an exchange of common stock resulted in the acquisition of Harry T. Campbell Sons' Corporation, Baltimore, M. D., as a wholly owned subsidiary of The Flintkote Company, New York, a major producer of diversified nonmetallic minerals.

This change of ownership will not affect in any way the operation of Harry T. Campbell Sons and its subsidiaries—Clark Concrete, Inc., Teeter Stone, Inc., Clinchfield Sand & Feldspar Corporation, and the Campbell Dry Mix Corporation. Management, supervisory personnel, and employees will remain in their former posts. One of the new subsidiary's officers will become a member of the Flintkote board of directors.

Cement Capacity in Turkey Climbs from 1950 Levels

Cement production in Turkey has reached 1,963,000 metric tons with the construction of 17 new production units. This is a five-fold increase over the 395,000 tons produced in 1950. Additional facilities now under construction are expected to boost output to 2,770,000 metric tons.

Export sales of Turkish cement in 1959 amounted to 100,000 tons, valued at $937,500. The country has imported no cement since 1953.

General Portland Cement Plans Quadrupled Funds For Plant Expansions

General Portland Cement Company will spend an estimated $11 million in 1960 for improvement and plant expansions. This is a sharp increase in capital outlay of about four times the amount paid out in 1959—$2,689,956. Adding estimated 1961 expenditures, the projected two-year total will be about $18 million.

The current program provides for increasing the annual productive capacity of the firm's Tampa, Fla., plant by 3,000,000 bbl. at a cost of $17,000,000. This project is described in PIT AND QUARRY, January, 1960, page 102.

U. S. Gypsum Company anticipates the firm's capital expenditures during 1960 will rise to about $36 million from the $30.1 spent during 1959.

Coming Events

April 21-22, 1960—Los Angeles. Southwest Metals and Minerals Conference, American Institute of Mining, Metallurgical and Petroleum Engineers. Ambassador Hotel.

May 17-19, 1960 — Milwaukee. Second Technical Conference of Cement Industry Sub-Committee, The American Institute of Electrical Engineers. Hotel Pfister.

May 23-25, 1960 — Sea Island, Ga. Annual convention, National Lime Association. The Cloisters.

June 13-14, 1960 — Chicago. Board of directors meeting, National Limestone Institute, Inc. Edgewater Beach Hotel.

June 26-July 1, 1960 — Atlantic City. 63rd annual meeting and apparatus exhibit, American Society for Testing Materials. Chalfonte-Haddon Hall.

July 20-23, 1960—Midyear meeting, N.C.S.A. board of directors. The Greenbrier, White Sulphur Springs, W. Va.

Jan. Construction Awards Show 5 Percent Drop F. W. Dodge Corp. Reports

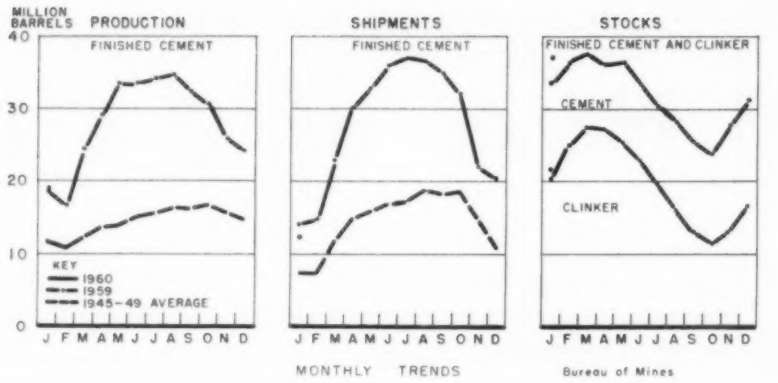
January construction contracts in the United States (excluding Alaska and Hawaii) totaled $2,193,000,000, down 5 percent from January, 1959. This is the sixth consecutive month showing a drop in award totals as compared to year-earlier months.

Housing and highways, the two largest categories in construction work, showed continued declines and thus were chief factors in the January drop. The seasonally adjusted Dodge Index of construction contracts fell to 235 from December's 244 (1947-49=100).

Item: housing contracts fell 9 percent from the corresponding 1959 month to $926,966,000.

Item: non-residential building contracts dropped 2 percent to $801,402,000. Gains in stores, factories, and schools were offset by declines in hospitals, airport terminals, and other miscellaneous structures.

Item: heavy engineering contracts fell 3 percent to $464,581,000. Contracts in this category have been falling sharply for several months as highway awards declined from the high levels of the last half of 1958, when federal anti-recession legislation boosted such awards. But the highway decline was one of the smallest in six months, compared with year-earlier levels, and it is expected that future percentage declines will become smaller.



Prepared by D. O. Kennedy, under the supervision of G. W. Josephson, Chief, Branch of Construction and Chemical Materials, Division of Minerals. March 1, 1960.

—January, 1960, Finished Portland Cement—

SUMMARY—Production of finished portland cement in January, 1960, as reported to the U.S. Bureau of Mines, totaled 18,669,000 barrels—an increase of 0.3 percent compared with January, 1959. Mill shipments totaled 12,766,000 barrels—a decrease of 11 percent compared with January, 1959. Stocks of 37,088,000 barrels of finished portland cement on hand January 31, 1960, were 6 percent higher than those on hand January 31, 1959. Clinker production during January, 1960, totaled 24,079,000 barrels, an increase of 3 percent compared with January, 1959.

PRODUCTION—One hundred and fifty-three (153) plants in 38 states and Puerto Rico reported a production of 18,669,000 barrels of finished portland cement during January, 1960, compared with 18,604,000 barrels produced in January, 1959.

Production of clinker was 24,079,000 barrels, compared with 23,367,000 barrels during January, last year.

High-early-strength portland cement totaled 1,444,000 barrels—an increase of 20 percent over the January, 1959, production.

Prepared masonry cement production of 935,000 barrels increased 17 percent over the January, 1959, production.

SHIPMENTS—Mill shipments of finished portland cement for January, 1960, were reported by one hundred and sixty nine (169) plants and totaled 12,766,000 barrels compared with 14,416,000 barrels in January, 1959.

Shipments were higher in 6 districts, lower in 16 districts, and unchanged in 1 district compared with shipments in January, 1959. The greatest increases were the New York-Maine, and eastern Pennsylvania-Maryland districts. The greatest decreases were in the Kansas, western Missouri-Nebraska-Oklahoma-Arkansas, Alabama, Texas, Louisiana-Mississippi, and Wyoming-Montana-Idaho districts.

Mill shipments of high-early-strength portland cement totaled 869,000 barrels—an increase of 13 percent over the 769,000 barrels shipped in January, 1959.

Mill shipments of prepared masonry cement totaled 583,000 barrels—a decrease of 17 percent from the 706,000 barrels shipped in January, 1959. Nearly 85 percent of these shipments were from mills east of the Mississippi River. Prepared masonry cements are shown in 376-lb. barrels although they are sold in varying weights.

STOCKS—Mill stocks of 37,088,000 barrels of finished portland cement were on hand January 31, 1960—an increase of 6 percent over the 34,838,000 barrels on hand January 31, 1959. Stocks of clinker on hand January 31, 1960, totaled 21,868,000 barrels—an increase of 7 percent over the 20,364,000 barrels on hand January 31, 1959. ●

Advanced Engineering Group Formed as New P.C.A. Unit

A specialized unit, called the Advanced Engineering Group, has been formed at the Chicago general offices of the Portland Cement Association. It is headed by Alfred L. Parme, nationally known structural engineer.

Purpose of the unit is to apply advanced engineering and mathematical principles to achieve more efficient use of concrete and to develop basic engineering data. Full utilization will be made of the P.C.A. $10,000,000 research and development laboratories in Skokie, Ill.

Walter E. Kunze, formerly assistant manager of the Structural and Railways Bureau and manager of personnel training, will assume Mr. Parme's former position as head of this bureau. John C. Seeger Jr. will replace Mr. Kunze as manager of P.C.A.'s personnel training program.

$2,000,000 Terminal Planned At Seattle for Ideal Cement

A site on the Duwamish Waterway in Seattle, Wash., has been acquired by the Ideal Cement Company for a $2,000,000 distribution terminal.

Among the components of the terminal will be six concrete silos, a packhouse, an office building, and facilities for loading trucks and railway cars with either bulk or packaged cement. Storage capacity will be in excess of 100,000 bbl.

Drive-under, gravity-fed silos will permit loading of up to 15 145-bbl. bulk cement trucks per hour. Barge and ship facilities *via* an all-concrete dock will expedite the rate of unloading and transferral to the terminal to 4,000 bbl. per hour.

Construction of this terminal is a part of Ideal's 10-year expansion program, which will probably cost $170,000,000. Another terminal is being erected at Vancouver, Wash.

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SMALL PLANTS:

open new markets!

with an Eagle fine material screw washer

With an Eagle Fine Material Screw Washer-Classifier-Dehydrator on the job, you can upgrade your product—meet specifications—open new markets—and frequently sell at a higher price. An Eagle Fine Material Screw Unit will wash your sand clean and retain or remove fines as required to give you the sand you need. Can handle concrete sand, mortar sand, plaster sand or finer sands. If you have the material in your deposit an Eagle Fine Material Screw will get it ready for market quickly and at lowest cost per ton.

The small, single screw fine material unit shown above, has been doing a good job producing alternately concrete and mason sands for L. A. Demers, Winooski, Vermont, for several years.

Send a 10 lb. sample of your pit run material to us and let our engineers run a free test to determine what an Eagle Washer could do for you. Send for Catalog 58.

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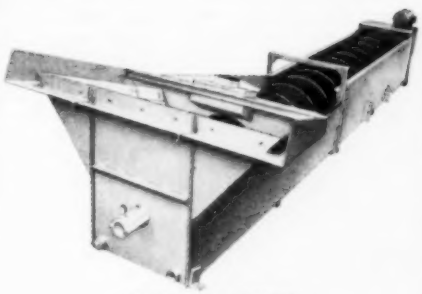


EAGLE SINGLE SCREW WASHER-CLASSIFIER-DEHYDRATOR

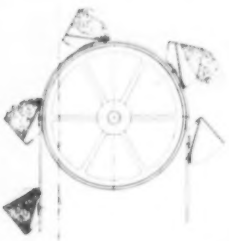
Eagle's years of experience are evident in its design and performance. Large settling pool. Baffled feed box reduces turbulence and feeds in material at optimum location. Totally enclosed gear drive runs in oil bath. A capacity for every need.

EAGLE DOUBLE SCREW WASHER-CLASSIFIER-DEHYDRATOR

Have double the raking capacity of single screw units. Long three-sided overflow weir easily adjusted for retaining or wasting fines. Lower bearings water lubricated under pressure, as with all Eagle Washers. Trouble-free, profitable production assured.

CARRY A FULL PAY LOAD ON EVERY TRIP

M-T-MATIC Buckets are the NEWEST in self-cleaning elevator-conveyor buckets. They give you savings in time and labor costs by delivering a full payload in SAND . . . GRAVEL . . . CLAY . . . or any other sticky granular material.



M-T-MATIC PAYLOAD BUCKETS for BELT or CHAIN MOUNTING

Materials can't build up in the M-T-MATIC Bucket. The separately mounted stripper plate replaces the back of the one-piece bucket. It's trouble-free.

WRITE TODAY FOR PRICES.
Give your bucket size.

PEKAY MACHINE & ENGINEERING CO.

865 N. SANGAMON STREET
Chicago 22, Illinois

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December Lime Sales Rise Sharply— Preliminary 1959 Report also Shows Gains

In December, 1959, the monthly production of open-market and captive lime passed 1,000,000 tons for the first time. This record output—1,001,314 short tons—was 21 percent above November's total, and 37 percent higher than in December, 1958, according to reports made to the U.S. Bureau of Mines by plants producing 10,000 or more short tons per year.

In 1959, lime sales totaled 9,310,527 short tons, compared to 7,747,616 short tons in 1958. This established an all-time record, exceeding by 1.5 percent the 1956 record. The accompanying table shows total lime sales by types and major uses.

Consumption increased in all use categories, except agriculture; the gain in chemical and industrial lime was spectacular. Percentages of the increased consumption of lime in 1959 are as follows: construction lime—up 10 percent, chemical and industrial lime—up 25 percent, agricultural lime—down 5 percent, and refractory lime—up 16 percent.

Refractory lime or dead-burned dolomite, sold and used, drastically declined during the prolonged national steel strike of July through October. Upon the resumption of steel production in November, manufacture of refractory lime was also resumed. An all-time record for a month's production was established in December as steel production moved upward toward full capacity in a year-end all-out effort to counteract the steel deficit.

Lime Sold and Used by Producers* in the United States, in Specified Periods of 1958-59; by Types and Major Uses in Short Tons

	November	December		January-December	
	1959	1959	1958	1959	1958
By types:					
Quicklime	670,267	828,909	604,839	7,248,559	5,872,763
Hydrated lime	154,312	172,405	125,334	2,061,968	1,874,853
Total	824,579	1,001,314	730,173	9,310,527	7,747,616
By uses:					
Agricultural:					
Quicklime	2,851	3,782	6,614	63,657	56,613
Hydrated lime	2,968	6,453	8,260	103,350	119,599
Total	5,819	10,235	14,874	167,007	176,212
Construction:					
Quicklime	6,696	6,354	9,635	159,345	133,740
Hydrated lime	68,349	66,938	47,191	977,333	900,628
Total	75,045	73,292	56,826	1,136,678	1,034,368
Chemical and other industrial:					
Quicklime	472,981	562,945	392,652	5,055,499	3,977,309
Hydrated lime	82,995	99,014	69,883	981,285	854,626
Total	555,976	661,959	462,535	6,036,784	4,831,935
Refractory (dead-burned dolomite)	187,739	255,828	195,938	1,970,058	1,705,101

*Includes captive tonnage, and excludes the output of plants producing less than 10,000 tons a year.

Keystone Division of Dravo Adds 500-T.P.H. Dredge

The Keystone Division of Dravo Corporation has taken a major step in expanding its facilities by adding one of the largest sand-and-gravel dredges on the inland waterways.

The dredge, which carries its own heavy-media separation plant, has an ouput capacity up to 500 t.p.h. of four grades of aggregate simultaneously. The unit is now in service on the Ohio River between East Liverpool and Steubenville.

JOSEPH DES MARAIS has been named manager of the Indianapolis district of National Gypsum Company.

Boise Cascade Corporation Buys Two West Coast Sand and Gravel Firms

Boise Cascade Corporation, Boise, Idaho, has acquired two new properties: the Klinker Sand and Gravel Company, Seattle, and Chaussee-Swan Gravel Company, Boise.

Klinker Sand and Gravel is one of the oldest producers of sand, gravel, and ready-mix in the Puget Sound area. It will be operated as a division of Boise Cascade, and Charles R. Hartman will be retained as general manager.

Chaussee-Swan, a major supplier of sand, gravel, and ready-mix in the Boise Valley, will be integrated with Western Redi-Mix Products, a wholly owned subsidiary of Boise Cascade; Western Redi-Mix will be in charge of the combined companies. A. J. Chaussee will retire, while John Swan will remain with the firm in an advisory capacity.

Boise Cascade also operates Graystone, Inc., a concrete products producer with plants throughout Washington.

Corvallis Sand & Gravel Co. Sold to Founder's Family

Sale of the Corvallis Sand and Gravel Company, Corvallis, Oreg., has been announced by John H. Gallagher, founder of the firm. The business, which was established in 1911, was purchased by members of his family: John H. Gallagher Jr., president of the firm; his wife, Ann K., vice-president; Donald A. Gallagher, plant superintendent and secretary-treasurer; and Rae A., his wife, vice-president.

Originally set up to furnish railroad ballast, the company now includes transit-mix concrete, asphalt, and building materials.

A combined contract was awarded by the Lone Star Cement Company to the Baugh Construction Company for truck and rail loading facilities at the company's Seattle plant. Items included will be track and scale extensions, three 2,000-bbl. steel tanks (with provision for a fourth later on), and a conveyor system to make bulk cement loading virtually a push-button operation.

OWEN

the Greatest Name in Buckets All Over the World

Wherever you go, wherever you see excavating or handling of materials . . . there you will find one or more OWEN Clamshell Buckets on the job. Faith in their performance, confidence in their sturdy construction, and complete assurance in their ability to complete contracts satisfactorily and "on time" . . . these are the reasons that powerful, rugged OWEN Clamshell Buckets dot construction jobs all over the globe.

You'll get more from an OWEN in every way — Longer Life, Larger Loads, More Economical Operation. From drawing board to finished product, OWEN lives up to its great name in every way. Put the real worker on the end of the boom! — get a Great OWEN Clamshell Bucket without delay.

OWEN MATERIAL HANDLING BUCKETS

OWEN'S new center line reeving principle, now incorporated in a completely redesigned line of material handling buckets, is one factor that increases cable life of these buckets up to 75%. A full line now available from ¼ cu. yd. up to 10 cubic yards.

OWEN GRAPPLES

OWEN'S patented independent tine action 4-prong grapple has proven itself invaluable in land clearing operations. Its independent tine action guarantees positive contact and tremendous gripping power on each of the four tines, no matter how irregular the shape of the object may be.

Write us your exact requirements. Remember, OWEN Engineers are at your service. Send for Free Catalog today.

The OWEN BUCKET Co.
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NYGEN-BUILT

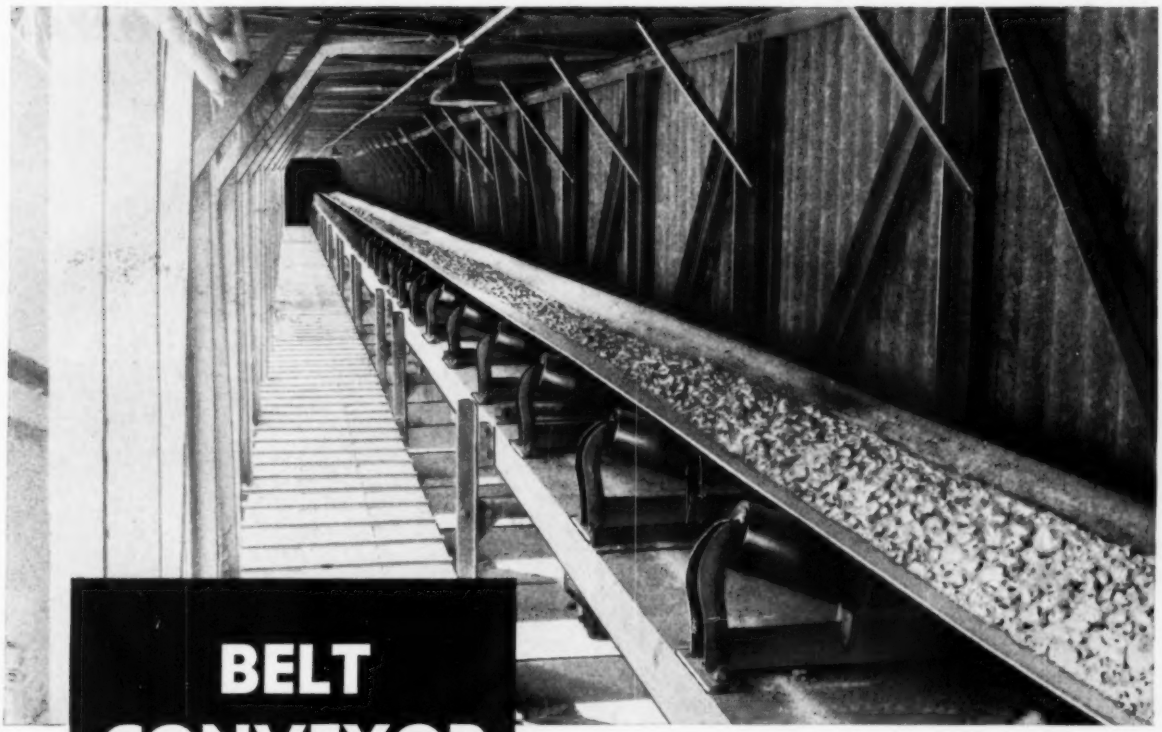
GENERAL TIRES

keep driving longer
for lowest cost-per-mile

It takes just one "down" unit to wreck schedules, eat up narrow profit margins. That's why more and more contractors count on the Nygen-built General Tire to keep units rolling whatever the going. Engineered for maximum traction and minimum rolling resistance, Generals take mud, sand, rock and grades in stride . . . help hold costs down to keep profits up. Prove it to yourself on your next big job.

THE GENERAL TIRE & RUBBER CO. Akron, O.

STEPHENS-ADAMSON



BELT CONVEYOR

handles greater tonnage at lower cost

Tons of crushed stone and aggregates are carried fast, efficiently and at a lower cost per ton on STEPHENS-ADAMSON Belt Conveyors. S-A quality engineered conveyor components increase materials handling efficiency while reducing equipment "down time" to a minimum. Long-lasting, low maintenance dependability is built into every S-A belt conveyor. Convey with S-A . . . the Equipment that's designed and built by the men who know conveying best . . . STEPHENS-ADAMSON.

S-A ENGINEERED PRODUCTS FOR BULK HANDLING

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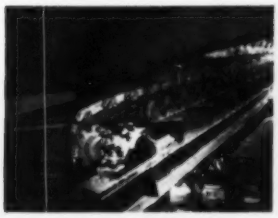

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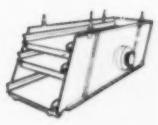
How to get 60 minutes out of

EVEN WHEN YOU'RE RUNNING 2 SHIFTS...

SYNCHRONIZE COMPLETE PLANT OPERATION Just as all the parts of a watch mechanism must function together to make it keep time accurately, so must all the various parts of your plant function together to produce the cleanest possible product in the fastest possible time. Check everything from pit to bins to make sure one piece of equipment is not creating a "drag", making it necessary for you to slow down your whole plant. Your profit picture for '60 will be no better than the slowest piece of equipment you own . . . so check now before you're into peak production.

CARE and MAINTENANCE Even the best equipment must have proper care and maintenance to do its best for you. You'll take a giant step towards beating the bug-a-boo of costly downtime by making sure your equipment is properly installed and properly serviced. Pay particular attention to moving parts. Follow the lubrication recommendations of the manufacturer and you'll be on the road to better performance.

GET RID OF WEAK SISTERS A chain is only as strong as its weakest link. One misfit or worn-out piece of equipment in your plant can cost you profit dollars way in excess of the replacement cost. Look at the big picture . . . what production do you want out of your plant? O.K. then what pieces of equipment are likely to create a bottleneck preventing you from reaching this goal? It's just that simple . . . get rid of that equipment . . . you can't afford to keep it!



HOW TO REPLACE FOR PROFIT If you follow these three guides you can't go wrong in replacing worn-out, undersized or obsolete equipment for better profits. 1. Make sure you know what capacity you are planning for . . . and then allow for reasonable expansion without excessive cost in the bigger years ahead. 2. Take advantage of reliable manufacturers experience and know-how in selecting the right equipment for long term service. 3. Be sure your new equipment is backed by fast factory service in case anything does go wrong . . . or if parts should be needed.

every production hour . . .

OR AROUND THE CLOCK!

Yes, it's a wise operator who heeds the advice to the left, who takes stock of his plant, makes sure he is set with a synchronized, up-to-date plant ready to take advantage of the predicted big volume 60's. And he knows that his vibrating screens are the "heart" of his operations and that his plant's potential is directly linked to their ability to "stand the gaff" during round-the-clock or peak production. And a rapidly increasing number of operators around the country know they're "SAFE with SECO" for these 4 big reasons:

1. SECO will make the *right* screen recommendations for size, wire cloth openings and mounting the *first* time. No Monday morning quarterbacks here.
2. SECO furnishes instruction manuals that are clear and concise and make maintenance a simple matter.
3. More than a quarter century of "know how" devoted to vibrating screens exclusively. And this "know how" is based on actual field experience, not armchair theorizing.
4. SECO service can't be beat. Remember . . . SECO is in your corner and wants to do everything within reason to insure your success. Example: SECO ships standard parts the same day ordered.

If you've got a problem and need the right screen recommendation *first*, pick up the phone and call us . . . we'll be glad to help you solve it.

SECO

"TIME CONSCIOUS" VIBRATING SCREENS

Send for these helpful screening guides

4-BEARING CATALOG #204 AND TWIN BEARING BOOKLET TB-21

SCREEN EQUIPMENT CO., INC.

Buffalo 25, N. Y.

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$25,000,000 Dundee Cement Plant Producing 5,000,000 Bbl. Annually

PRODUCTION began recently at the Dundee Cement Company's $25,000,000 plant, 45 miles southwest of Detroit. Annual output is expected to be 5,000,000 bbl.

Workers trained during the last year have manned the newly installed machinery, which cost Dundee $10,000,000. It was indicated that cement soon will be shipped to Michigan, Ohio, Indiana, Illinois, and southern Wisconsin.

In addition to outsize mills, described as the "largest of their kind in the world," there are two kilns, each 460 ft. long and more than 16 ft. in diameter. Each kiln consumes 300 tons of powdered coal per day to generate the 2,500 deg. of heat required; and they turn at the rate of approximately 1 r.p.m.

The mills are so large—12 ft. in diameter and 36 ft. long—that each requires a 2,500-hp. motor. Efficient design has resulted in a unit construction cost of only $5 per bbl. of annual production.

At the 5-sq. mile Dundee tract only 20 ft. of overburden cover successive 20-ft. and 40-ft. deposits of clay and limestone, the two ingredients which make up 95 percent of the content of finished cement. Only gypsum must be shipped in. Deposits sufficient to meet rated capacity needs for more than 100 years have been proved; and recovery is at the rate of 5,000 tons of limestone and 2,500 tons of clay per day.

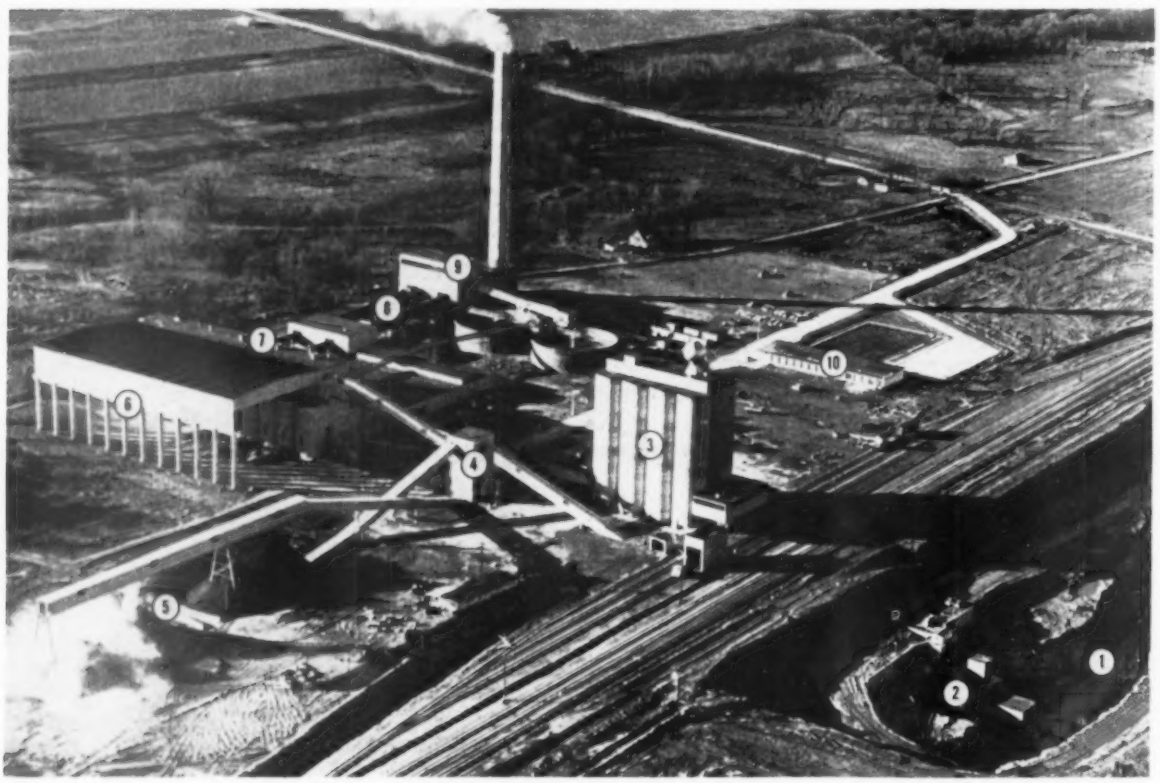
Dundee has storage silos and a shipping dock at Monroe, Mich., providing easy access to water transportation. Electrical power is plentiful, and sufficient labor and technical personnel are available in the area.

The plant layout is extremely compact, and all major equipment is under one roof. A straightline production process leaves room enough for a 100 percent capacity increase.

To facilitate delivery to the five-state market, a distribution center was completed last year in Chicago. Distribution centers are under construction at Cleveland and Cincinnati.

EDWARD P. CADWELL has been promoted to the post of chief metallurgist for Cyanamid International, a co-ordinating division of American Cyanamid Company's overseas operations. He will have headquarters in New York.

Dundee Cement Company's $25,000,000 plant, near Dundee, Mich. Indicated below are: (1) the quarry, containing clay and limestone deposits adequate for more than 100 years of peak production; (2) the primary crusher, which reduces limestone to a size suitable for the conveyor; (3) the cement storage silos (150 ft. high) with rail- and truck-loading stations; (4) conveyors and pipelines hauling raw materials and coal; (5) the crushed limestone and coal storage area; (6) the storage area for 200,000 tons of cement clinker; (7) the main plant, housing the five "largest grinding mills in the world"; (8) the two 460-ft. kilns; (9) the electrostatic precipitator area; and (10) the main office building.



Owens-Illinois, through years of experience, *thinks in packaging terms* in glass and plastic containers, corrugated boxes, closures and multiwall bags.

It pays to buy bags from a packaging specialist

PACKAGING EXPERIENCE assures you of the proper design of the multiwall bag to fit its specific uses, dependability of service to give you the right bag, when and where you need it, and, of course, the finest quality.

Owens-Illinois standards of service, quality control, and design are based on the needs for protection, safe transport, and convenient use of your product.

For the right multiwall bag for every packaging, handling, storage, and shipping method, call Owens-Illinois.

MULTIWALL BAGS
AN (O) PRODUCT

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GENERAL OFFICES · TOLEDO 1, OHIO

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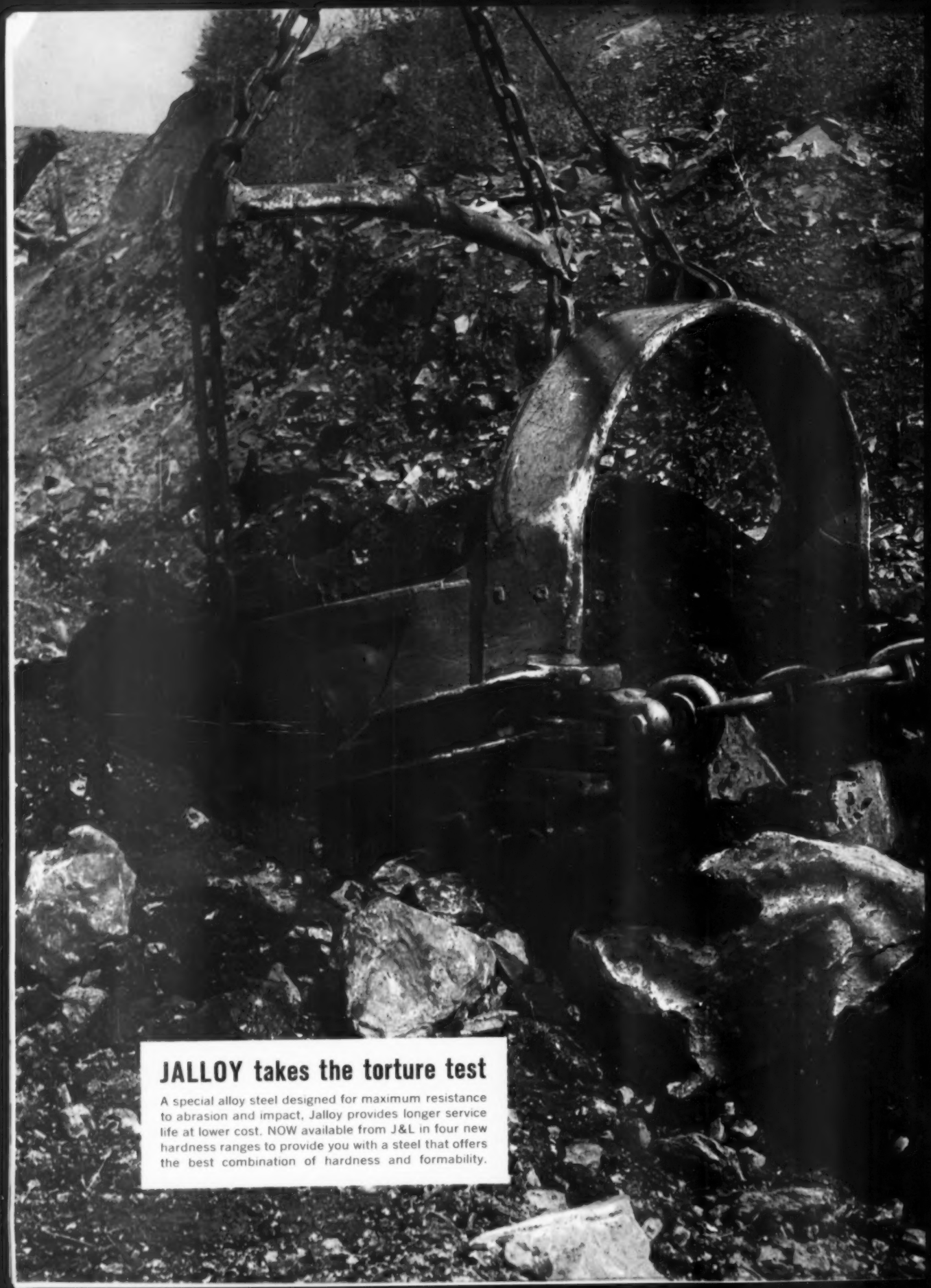
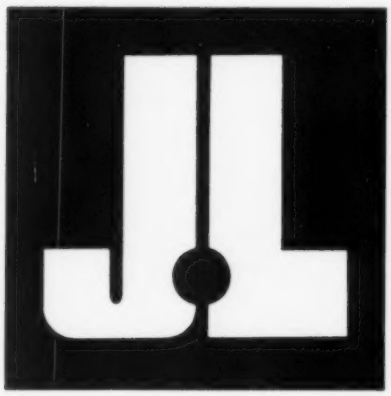


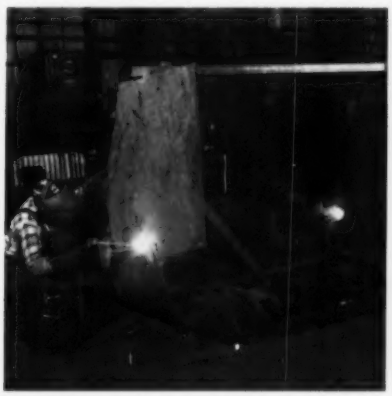
JALLOY takes the torture test

A special alloy steel designed for maximum resistance to abrasion and impact, Jalloy provides longer service life at lower cost. NOW available from J&L in four new hardness ranges to provide you with a steel that offers the best combination of hardness and formability.

Jalloy is tougher, by three to four times, than the ordinary mild carbon steel used in conventional buckets—two to four times as resistant to atmospheric corrosion.

Jalloy is readily flame cut, easy to weld. It provides longer wear and less repair.





Jalloy is produced in four new hardness ranges to provide the flexibility to meet various needs. All four are used in this bucket.

Jalloy plates measuring 6′ x 20′ are cold formed to a 96-inch radius for this mammoth 9-yard dragline bucket.

Recent field tests show Sullivan Trail buckets are stronger, lighter, longer-lasting by at least 30% because . . .

bucket arches & skids & backs & bottoms & bucket jaws are all J&L JALLOY steel

Rugged strip mining operations in the anthracite coal fields around Wilkes-Barre, Pa., demand rugged dragline buckets.

A mining expert with the Sullivan Trail Manufacturing Company, West Pittston, Pa., says:

"Frequent and major repair work on conventional buckets pointed up the need for a bucket that would last longer and have greater strength with less weight."

Design of a new super-bucket began nearly five years ago with the selection of a special heat-treated alloy steel—JALLOY—for bucket areas subjected to severe stress, strain, impact and abrasion. Since then the Jalloy bucket has undergone severe field testing which indicates a 30 per cent longer life.

Recently, through close coordination with J&L's Technical Service Department, Sullivan Trail has saved money and simplified fabrication of the new bucket. By introducing a variation in heat-treatments, J&L developed a new series of *four* Jalloy hardness ranges. Each provides a different combination of formability and resistance to impact and abrasion. The Sullivan Trail bucket now employs all four Jalloy ranges.

If you have a similar problem, Jalloy is your answer. Contact your nearest distributor or J&L district office and ask about Jalloy. Or, write directly to Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania, for the new booklet entitled *Jalloy*.

Jones & Laughlin Steel Corporation

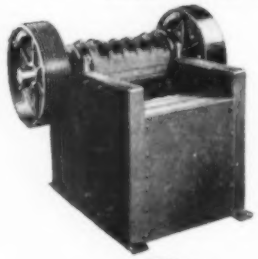
PITTSBURGH, PENNSYLVANIA

For men who like to underbid their competitors

(and make a nice profit, too!)

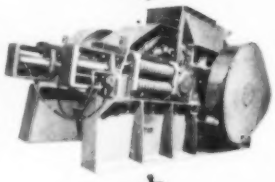
JAW CRUSHERS

PIONEER overhead eccentric action offers double action crushing stroke, thus providing forced feed and greater capacity. Shaft bearings placed closer than on any other crusher. Double-walled, welded steel base reduces weight at the same time it increases strength. Reversible jaw plates. Available in 10 sizes from 1016 to 4248.



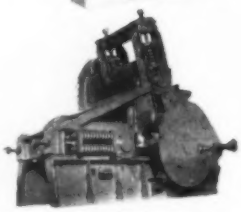
TWIN ROLL CRUSHER

PIONEER design makes 100% of roll shell available as crushing surface. Hydraulic adjustment simplifies setting crusher to meet product size. Shells are easily replaced without removing bearings from shaft. Driven by star gears, completely enclosed and running in oil. 2416, 3018, 3024, 4022, 4030, and 5424 sizes.



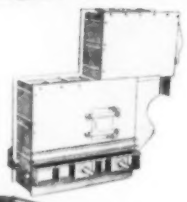
TRIPLE ROLL CRUSHER

Add a third roll and you have a triple roll crusher. This makes it possible to increase stage of reduction to as much as 6½". The Triple Roll Crusher is manufactured only by PIONEER. Available in 3018, 4022, 5424 sizes.



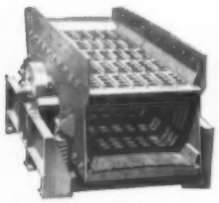
IMPACT BREAKER

The PIONEER 3648 Cuber is a multi-stage, regulated-flow impact breaker suitable for either primary or secondary crushing of relatively non-abrasive stone. Full gradation control. Capacity up to 150 tph of minus 1"; up to 350 tph of minus 3".



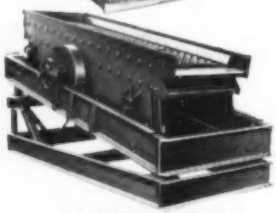
MESABI SCREEN

This heavy-duty vibrating screen withstands heaviest loads. Frame is 18" car channel on I-beams reinforced with 8" wide flange beams. Pans are ¾" or ½" thick. Four bearing, heavy duty shaft. Seven sizes from 4' x 10' to 6' x 14'.



VIBRATING SCREENS

PIONEER'S full-circle throw gives same positive down-hill vibration at each end as in middle, thus every square inch works for you. Exclusive secondary spring suspension mounting effectively confines vibration to pan. 2 and 3 deck screens in 11 sizes.



CONVEYORS

Available in 18", 24", 30", 36", and 42" widths. Easy-to-erect *pre-engineered conveyors* range in length from 30' to 120' in 5' increments. *Job-engineered conveyors* for horizontal, extra long, or other special installations are available in any length from 12' up.

PORTABLE CONVEYORS

On hydraulic cradle truck for easy portability and one-man operation. A 70' conveyor is easily raised to operating position in 9 minutes, lowered in 1 minute. Available in 18", 24", 30", 36" widths; in 40', 50', 60', 70' lengths.

APRON FEEDERS

Heavy-duty PIONEER Apron Feeders have ½" thick, overlapping, forged steel pans carried on heavy chains supported on wide heavy duty rollers. Available with or without straight or flared sideboards. Widths 30", 36", 42", 48". Lengths 6', 8', 10', 12', 14' and larger.

PORTABLE APRON FEEDERS

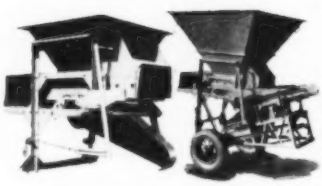
Mounted on pneumatic-tired chassis. Used in place of conveyor for feeding heavy, sharp, abrasive rock to portable primary crushing plant. Easily detached for quick job-to-job moves. Available in two sizes: 36" x 30' and 42" x 30'.

PIONEER ORO FEEDERS

The most rugged feeder made. Pans, rollers, drive sprockets and idlers cast from special high alloyed manganese steel. Pans are from 9/16" to 1" thick, depending on width of feeder. Chain links are cast as part of pan so there are no bolts or rivets to break or loosen. Available in 30", 36", 42", 48", 60", 72", 84" widths.

MECHANICAL FEEDERS

PIONEER Reciprocating Plate Feeders provide uniform flow of material to conveyors. Available in five different models.



BUZZER SCREEN

This small, compact vibrating screen fits on PIONEER Portable Conveyor and is also available with bin mounting. 3' x 6' size for production of ¾" material up to 50 tph; 4' x 8' size for production of ¾" material up to 90 tph.

For further information on any of the equipment described on this page or on PIONEER Portable Crushing and Screening Plants, Washing Plants, Bituminous Mixing Plants, *VIBROmatic* Bituminous Pavers, Conveyor Towers and Supports, Rock Ladders, Bins and other PIONEER Equipment, write or call Pioneer Engineering, Division of Poor & Company, Inc., Minneapolis 14, Minnesota or your PIONEER Distributor.

Pioneer
EQUIPMENT

Construction Put in Place Sets a New Record Peak For February—$3.6 Billion

The value of new construction put in place in February amounted to $3,600,000,000, a new record high for the month, according to preliminary estimates of the U.S. Department of Commerce. This total is only 4 percent below the January level, less than the usual seasonal decline.

Items: private construction expenditures are estimated at $2,700,000,000—down 3 percent from January, 1960. Private residential construction was down 7 percent, at $1,400,000,000. Both declines were less than the usual seasonal drop.

Items: public construction expenditures were estimated at $900,000,000—down 7 percent from January and down 12 percent from February, 1959. A major drop was registered in highway construction.

First two months: construction expenditures in the first two months of 1960 totaled $7,300,000,000—up 1 percent from the same period last year. Highway construction was valued at $530,000,000—down 21 percent. The seasonally-adjusted annual construction rate is now placed at $55,600,000,000. This compares with the government prediction for a record $55,300,000,000 year, up $1 billion from 1959.

N.Y., California Firms Bought By American Cement Corp.

American Cement Corporation, Philadelphia, has acquired the M. F. Hickey Company, Inc., New York City, and Graham Brothers, Inc., Los Angeles. Graham Brothers, Inc., is a large producer of sand and gravel in the Los Angeles area. This firm and M. S. Hickey Co. have been active in the ready mixed concrete business for more than 40 years. Details of the transactions were not disclosed.

These two companies will be operated as subsidiaries of Americaa. In accordance with American's policy of decentralization, Lawrence F. Hickey will continue as president of M. F. Hickey Company, Inc., and Paul C. Graham and Russell C. Graham will continue as chairman of the board and president, respectively, of Graham Brothers, Inc.

● After more than 51 months of continuous operation at the site, this is all that remains of Black Lake, Quebec. What was once a 500-acre lake is now an open-pit asbestos mine operated by Lake Asbestos of Quebec, Ltd.

How was this feat accomplished? The $2,700,000 dredge "Fleur de Lis" pumped out a total of more than 75,000,000,000 gallons of water at the rate of 45,000 g.p.m. In addition, the dredge removed over 31,029,000 cu. ft. of silt and overburden to expose the asbestos deposit. Two tugs served as icebreakers during the harsh Quebec winters to keep the project on schedule.

The mine began producing in October, 1958, with the dredge still pumping out the lake bottom. Its job completed, the "Fleur de Lis" is retained on a standby basis, as shown here, resting on blocks at the bottom of Black Lake.

Annual capacity is 100,000 tons of fiber. The adjacent mill can be seen in the right background, above the mine benches. Lake Asbestos is a wholly-owned subsidiary of American Smelting and Refining Company.

Expansion, Modernization Ups Output at Gibsonburg Lime

Quicklime production was increased 80 percent by the recent installation of a new kiln and processing equipment at Gibsonburg Lime Products Company, Gibsonburg, Ohio. The new equipment will also increase the number of dolomitic quicklime products.

The old 140-t.p.d. rotary kiln was replaced by a 240-t.p.d. kiln which utilizes a preheater of recent-design. The older kiln is used for auxiliary capacity. Belt conveyors have replaced the previous method of hauling stone *via* truck from quarry to storage pile. New grinding, screening, and loading sections have also been added.

Silica Sand Processing Begins At Simplot Sand-Clay Plant

Silica sand production operations went on stream in March at the new J. R. Simplot Miclasil operations at Bovill, Idaho. Construction began last fall on the $1,500,000 clay and silica beneficiation plant. (See PIT AND QUARRY, October, 1959, p. 44.) The plant is on an 8,000-acre tract containing large deposits of the sand and clay.

The silica sand is to be used in the manufacture of flint glass and crystal, and the clay for paper coating processes. Production is expected to be at the rate of 3,000,000 bags (100 lb. each) annually. Construction will be completed late this spring.

A European mining technique is being used by International Minerals and Chemical Corporation (Canada) Ltd. in the potash mine it is completing in Saskatchewan. The technique called tubbing, employs a cast iron lining for the mine shaft; it is a vertical application of cast iron vehicular tunneling commonly used under rivers and lakes. The firm is a Canadian subsidiary of International Minerals and Chemical Corporation.

NEW ROCK LOADING TEAM

Hauler: 13-ton Michigan Tractor Wagon
Loader: 2¾ yd Michigan Tractor Shovel
Output: 2,400 tons daily on 2-mile cycle

Four years ago, the Fort Scott Hydraulic Cement Company, Fort Scott, Kansas began a program to replace their four crawler-loaders and two 10-ton tandem-axle dump trucks with the most modern equipment available.

The program was completed when a 13-ton rear-dump Michigan Tractor Wagon went on the job a year ago. Its addition gave Fort Scott, one of the nation's three major natural cement producers, an all Michigan fleet. The Wagon teams with a 2¾ yd Model 175A Michigan Tractor Shovel in the rock pit. Three other 2¾ yd Michigan Tractor Shovels handle the crushed rock, coal, and clinkers in this 4,500 barrel-a-day natural cement plant.

Tractor Wagon hauls 120 tons per hour

It's the heavy rock loading and hauling operation that Mr. Pat Thomas, president of the 92-year-old firm, points to as being the best example of how the Michigan machines have improved job efficiency.

Shot Florentine limestone is currently being loaded out of the far end of a pit 90 feet wide and 5,000 to 6,000 feet long. This makes the average haul cycle, between pit and crusher, about two miles.

The 162 hp Tractor Wagon's stability and speed of up to 31 mph is a prime production factor in the mile long *uphill* run from pit to crusher. With torque converter and full power shift, power and speed are instantly adjusted to match the load demand.

On two 10-hour shifts, the Tractor Wagon, sideboarded to meet rated ca-

Michigan 162 hp Tractor Wagon, with torque converter and power shift providing top speed, barrels uphill to plant.

With hydraulic rear dump, Michigan unloads fast. Quick-interchange feature, Wagon for 10½ yd Scraper, provides added versatility.

In spare time, 13 ton Tractor Wagon takes crushed stone from hopper to stockpile.

BOOSTS PRODUCTION 25%

pacity, and the highly-maneuverable 2¼ yd Tractor Shovel will load out an average 2,400 tons of rock . . . rock which weighs, when loose, approximately 2,500 lbs per cu yd.

2 Michigans outwork 3 units formerly used

Production in the rock pit has risen 25% since the Tractor Shovel replaced a crawler rig with similar bucket capacity, and the Tractor Wagon took over the job formerly handled by two 10-ton dump trucks.

When maximum production from the crusher is not a factor, the Tractor Wagon is taken off the shot rock haul and used by itself to build up the crushed rock stockpile, an operation previously handled by two to four random-sized dump trucks.

Compaction has reduced haul road maintenance

An added advantage, according to Mr. Thomas, is the Michigans' compacting action on the haul roads. The 31,500 lb (plus load) Model 110 Tractor Wagon and the 29,000 lb Tractor Shovels have reduced maintenance and actually improved haul road conditions as they travel between pit and plant.

Upkeep "phenomenally small," says president

"With all five of the Michigans working constantly with heavy loads and over sharp rock and abrasive cinders, *we have spent less than $2100 on overhauls, parts, tires and labor during the past three years,*" says Mr. Thomas. "I think this figure is extremely low considering what a machine goes through in a cement plant operation of this type. We have had virtually no downtime."

If you're hauling bulky materials off the highway, perhaps a Michigan Tractor Wagon could increase your production, too. When you pair it with one of the eight Michigan Tractor Shovel models (up to 6 cu yds), you've got a team that can't be beat. Let us demonmonstrate. Just call. There's no obligation, of course.

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK® EQUIPMENT

2479 Pipestone Road
Benton Harbor 13, Michigan
In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

Enter 38 on card, page 169

Hoped for: increased loading efficiency
Received: that PLUS 4 *other production jobs*

Result: Michigan replaces 6 machines

By purchasing a big Michigan Tractor Shovel, A. Cope & Sons Ltd, Hamilton, Ontario, naturally could expect *some* production increase over smaller units previously used in their quarry stockpile loading operation.

What they didn't expect was the dramatic increase they got—over 3 to 1. Nor did they expect the variety of other production jobs the Michigan could do *in addition* to its regular loading chores. And, these were jobs that *had been* considered strictly in the realm of crawler dozers and swing shovels.

Daily output: 4,500 tons

In the loading operation alone, the big Model 275A did so well it replaced all three loaders formerly used—a 2½ yd crawler, a 1½ yd swing shovel, and a 2¾ yd

Tractor Shovel. With its 22,000 lb lift capacity and 4½ yd bucket, the power-shift Michigan loads a 12 yd truck in 60 to 70 seconds. In a typical "peak period" 10 hour

day, its output totals up to 4,500 tons of crushed stone. Unit services even the smallest trucks—each one taking only one pass, 20 to 30 seconds, to load.

"One of the Michigan's biggest advantages," says George Eskine, Quarry Supt, "is that it can load from all our stockpiles with a minimum of lost time for travel. Crawler immobility was of course one of the principal reasons we previously had to use three loading units."

In non-peak periods, the mobile 28 mph Michigan

also does many jobs which formerly required at least stand-by assignment of other machines. For example . . .

Builds stockpiles

Stockpiles are located against the face of an old blast area. Trucks, from the crusher, dump at the top. The Michigan Tractor Shovel "dozes" material onto the stockpile, replacing in this job the regular services of a medium-sized crawler-dozer.

Strips overburden

Formerly, a couple times a year, one or two 10-yd scrapers and operators were hired to strip the clayey

topsoil overburden. Now, the Michigan, equipped with bucket teeth, strips and loads this material into company-owned haul units.

Cleans up, loads rock

The Model 275A regularly cleans up after blast and around the 2½ yd swing shovel. This task, too, was formerly handled by a crawler-dozer. Occasionally, also, the 4½ yd Michigan takes over for the rock shovel. Here, Michigan capacity and maneuverability actually speed the operation. In three quick passes, the Michigan loads an 18-ton rock-hauler.

Mobility and two-way radio key to multi-job production

Right from the start, the Michigan's capacity to do more than just load trucks was evident. Supt Eskine reasoned that with a two-way radio, assignment of tasks would be handled with maximum efficiency. Now, in a matter of seconds, the Michigan can be on its way from stockpile loading to shot rock loading or any one of the five other jobs it normally handles.

The Model 275A, as well as three 17,000 lb lift capacity Model 175A's which the firm operates in other divisions, has helped A. Cope & Sons increase production while cutting overall machinery investment. Perhaps a Michigan Tractor Shovel could do the same for you. Call us for a no-obligation demonstration.

Michigan is a registered trademark of

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road
Benton Harbor 31, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

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Cement Sub-Committee, A.I.E.E. Second Technical Conference

Hotel Pfister, Milwaukee, May 17-18, 1960

The program for the second technical conference of the Cement Industry Sub-Committee, American Institute of Electrical Engineers, has been set up to cover a special topic at each of the four main sessions. J. V. Daily, Manitowoc Portland Cement Company is chairman of the publicity committee.

Headquarters of the conference will be the Hotel Pfister in Milwaukee, and dates are May 17 and 18. Sessions have been arranged as follows:

TUESDAY, MAY 17, 1960

10:30 a.m. MAINTENANCE AND SAFETY—Tentative moderator, H. P. Cassel
"Electrical Maintenance in Cement Plants"— Roy C. White
"Recommended Safety Practices Pertaining to Electrical Equipment in Cement Plants"—Mr. Cassel

1:30 p.m. AUTOMATION — Moderator, A. H. Huelsman
"A Review of Automatic Sampling—What Has Been Done to Obtain Truly Representative Samples"—R. J. Jager and J. A. Mitchell
"Some Fundamental Concepts of Regulating Circuits as Applied to the Cement Industry"—J. H. Rittenhouse and A. K. Raney
"The 1960 Status of the Riverside Computer Installation"—Leroy W. Weeks and Robert L. Boulden
"Developments in X-Ray Chemical Controls in the Cement Manufacturing Process During 1959 and 1960"—Bruce Kester, G. B. Moore, and W. P. Loranger
"Process Instruments as an Aid to Automating Cement Plants"—J. H. Herz
"The Use of a Magnetic Flowmeter for Automatic Metering of Slurries"—Bruce Kester

WEDNESDAY, MAY 18, 1960

9 a.m. DRIVES
"Requirements for Cement Plant Overhead Storage Cranes from a User's Viewpoint"—L. E. Swanson
"Selection of Electrical Equipment for Cement Plant Storage Cranes"—Albin A. Rutowski
"Typical Accuracies Required for Adjustable Speed Feeders in the Cement Industry"—John B. Woodward and Ralph H. Striker
"Comparison of Basic Drive Types for Adjustable Speed Feeders in Cement Plants"—Thord Offrell
"Suggested Standards for Electric Drives in the Cement Industry"—C. E. Roberts

1:30 p.m. DISTRIBUTION—Moderator, George E. MacDonald
"Preliminary Suggested Recommendations for Cement Plant Power Distribution"—A. C. Lordi
"Typical Application Consideration for Cable in Cement Plants"—W. A. Brown and D. L. Watkins
"Typical Installation Practices for Cable in Cement Plants"—G. I. Burner
"Typical Application and Installation Practices for Cables and Overhead Lines in Cement Plant Quarries"—W. A. Reynolds and W. T. Walker
"Interesting Features of the Electrical Equipment in Marquette's Milwaukee Plant"—G. H. Ember

Model R3W-20 Floor Type
Handles x-type bits up to 5"—cross type up to 5½"

DETACHABLE ROCK BIT GRINDER CUTS DOWN-TIME – LENGTHENS BIT-LIFE

BLOUNT machine-sharpens carbide-tipped rock drills far more accurately than any operator, however skilled, can by hand — and up to five times faster!

When you recondition your rock bits on a BLOUNT GRINDER, you can be sure of a uniform, symmetrical grinding job, including the exact angles the manufacturer intended.

Put a BLOUNT GRINDER to work for you, and get the savings so many customers report!

- ★ Longer bit-life — more regrinds per bit
- ★ Faster drilling
- ★ Reduced drilling upkeep
- ★ Lower cost per foot of drilling

PARTIAL USER LIST
Blount Bit Grinders:
Merritt Chapman & Scott Company, New York
Balf-Savin & Winkelman, New York
Shea-Kaiser & Morrison, California
Orinoco Mining Company (Subsidiary of U. S. Steel), Pennsylvania
Arch Dam Constructors, Utah
Subsidiary Companies of Bethlehem Steel Corp., Pennsylvania
Mount Vernon Contracting Corp., New York
Hanna Iron Ore Division (National Steel Corp.), Michigan
Jones & Laughlin Steel Corp., New York
Merritt Chapman & Scott Corp. of Panama, Balboa Canal Zone
James D. Morrissey Inc., Pennsylvania

J. G. BLOUNT Co.
Everett 49, Massachusetts
Div. Bowl-Mor Co., Inc.

Enter 42 on card, page 169

Seven Years Without A Slip— Cement Firm's Lab Sets Record

The testing laboratory at the Fairborn, Ohio, plant of Universal Atlas Cement Company has established a record of seven consecutive years to date without an error on interplant samples.

Each of the ten plants in the Universal Atlas chain participate in a testing program by sending samples of their cement to the other plants and to the division research laboratory at Chicago. Purpose of the tests is to maintain quality and to assure uniform and correct testing at each plant.

A.I.M.E. Publishes Manual On Industrial Minerals—Third Complete Revision

Industrial Minerals and Rocks, a publication of the American Institute of Mining, Metallurgical and Petroleum Engineers, has been released by A.I.M.E. in its third edition.

The 946-page volume contains material which has been completely rewritten from the second edition, which was published in 1949. It has been brought up to date and considerably enlarged, and contains a large number of maps and drawings.

All industrial minerals are covered in the 55 chapters of the book, each section of which was compiled by recognized authorities.

Industrial Minerals and Rocks can be obtained at $12 per copy from the American Institute of Mining, Metallurgical and Petroleum Engineers, 29 West 39th Street, New York 18, N.Y.

Neoprene-Modified Asphalt Used on N.J. Pike Shoulders

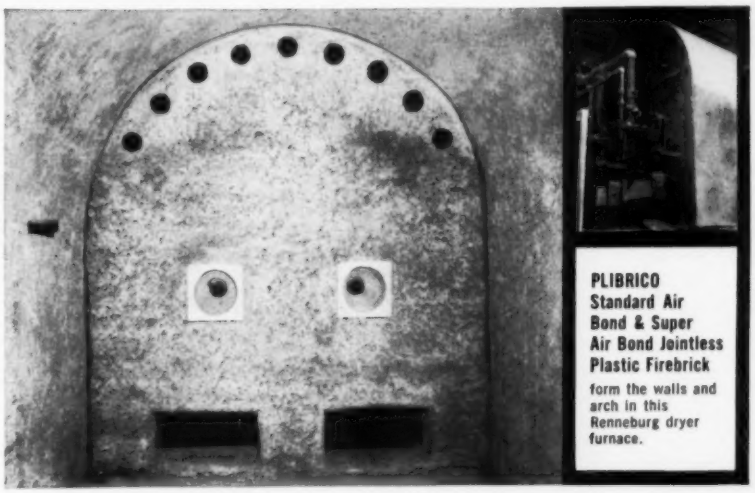
Neoprene-modified asphalt is now specified for construction and maintenance of inside shoulders on the New Jersey Turnpike, a new use for this material. It is the latest in a series of applications pioneered by the Turnpike Maintenance Department. Two installations totaling 13 miles have been completed between Newark and the turnpike terminus near the George Washington Bridge.

As applied on the Turnpike shoulders, cutback asphalt (Grade RC-2 or RC-3) modified with 0.5 percent of neoprene by weight and heated to 150 deg. F. minimum or 200 deg. maximum is deposited by a standard pressure distributor at an average rate of 0.3 gal. per square yard for seal-coating an existing 3-in. course of macadam. The stone cover is ⅜ in. of aggregate applied at the rate of 25 lb. per square yard by tail-gate spreaders or other mechanical means. The cover is rolled with an 8-ton tandem roller.

Neoprene had been used previously with asphalt emulsion for such applications as filling cracks in bituminous concrete pavement, sealing joints between concrete pavement and bridge deck slabs, sealing underbridge slope protection pavement, and constructing experimental surface treatments on bituminous concrete roads to improve anti-skid qualities.

This newest use (for inside shoulders) was tried out for the following reasons: improved workability, better chip retention, and lasting elasticity. These properties are expected to reduce bleed-through, improve traction, and give better performance at high summer and low winter temperatures. Expedition of returning the roadway to service after application of the material is also cited.

Kaiser Gypsum Company has taken options on industrial waterfront property in Houston, Tex., and Jacksonville, Fla., for the proposed construction of multimillion-dollar gypsum products plants. The options represent the start of major expansions of Kaiser Gypsum.



...at internationally known chemical plant

"Air Bath" lengthens life of dryer furnace

The nine air ports across the top of this furnace let tempering air enter and circulate beneath the arch. Heat build-up is reduced and the furnace lining lasts longer. Innovations of this kind are typical of Plibrico engineering . . . ideas born of years of specialized refractory/engineering experience.

Monolithic lining costs less . . . it is free from joints which cause linings to bulge and eventually collapse. And this Plibrico lining is securely anchored, too. Linings of Plibrico plastic refractory materials, and castables, install quickly. They conform easily to all contours and save the need for costly special shapes.

Single source guarantee . . . When you turn over full responsibility for top performance to Plibrico you can be sure of a properly integrated installation . . . years of engineering experience/the right materials for each furnace zone/careful supervision and installation.

Save money on your next installation, contact your local Plibrico Field Engineer . . . he can engineer refractory linings for any heat enclosure. WRITE FOR CATALOG 73 packed with cost-saving histories.

Plibrico REFRACTORIES

PLIBRICO CO., 1810 Kingsbury, Chicago 14 • Canadian Plant: New Toronto, Ont.
Plibrico Sales and Service Throughout the World
REFRACTORY PRODUCTS • ENGINEERING • CONSTRUCTION
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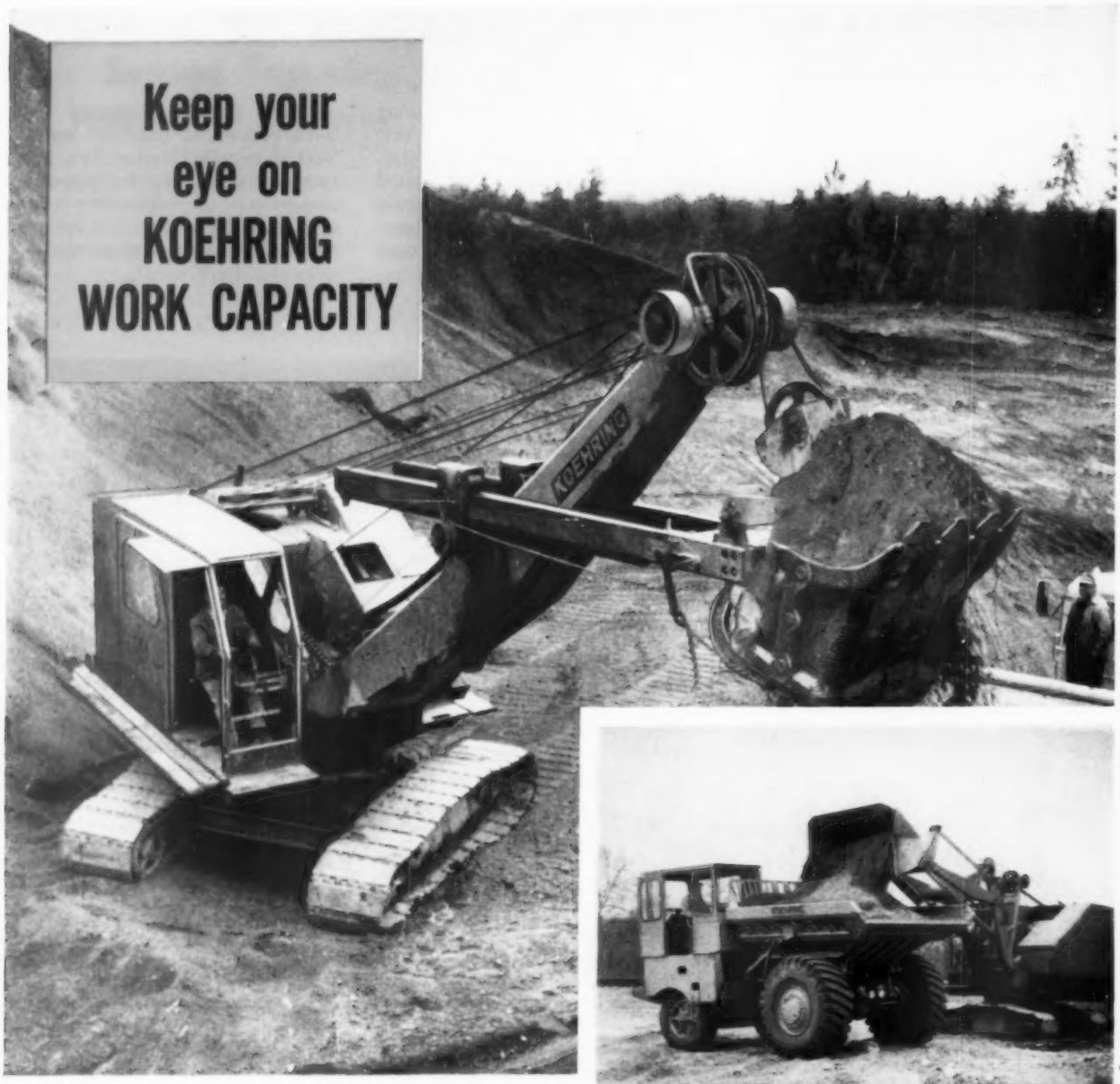
Keep your eye on KOEHRING WORK CAPACITY



Loading pit-run gravel — Fast-swinging 1-yard shovel accurately spots load "on target", keeps trucks on the move. For all its power and speed, 405 is easy on the operator. Big 26-inch main-drum power clutches require only *1/10th* the lever pull of comparable-size manual clutches — yet retain sensitive "feel" of load. Pays off in less operator fatigue — more output with all attachments: shovel, hoe, clamshell, dragline, lift crane and piledriver.

2 new products for mining and quarrying: (1) Koehring® 205 SKOOPER — a full-revolving, free-swinging 2-yard loader that crowds, hoists, swings, dumps, then swings back to digging position *without traveling*. Crowds bucket along a 7-foot level cut from *"stand-still"* position, or digs at any angle of bank slope. (2) That big hauler is the new Koehring *15-ton* Dumptor® — with 2-way controls, pivoting seat, 24 mph speeds in *both* directions for *no-turn* hauling. 30,000-lb. payload capacity. 28½% gradability. *Instant* gravity-dump or *controlled* gravity-dump by hydraulic cylinders.

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

Koehring excavators, cranes also manufactured in:
ENGLAND • SPAIN • JAPAN

In Canada:
KOEHRING-WATEROUS LTD.
Brantford, Ontario

Rocky overburden on steep, mountainous site made stripping conditions as tough as they come at this coal mine. No job for ordinary equipment! So, mine owner brought in a Koehring heavy-duty 1205 rock shovel, with results shown above. It's equipped with 3-yard dipper on 30-foot rock-type boom. Also available as *high-lift shovel* with 2½-yd. dipper on *50-foot* boom; 3-yard on *40-foot* boom.

Long-reach dragline loads sand and gravel out of deep, water-filled pit. It's the Koehring 805 — a special-size that fills an important production gap on many mine and quarry operations. Depending on weight of materials, 805 handles 2 to 3-yard dragline bucket on 50 to 150 feet of boom. What's more, this high-production 805 readily converts to clamshell crane, 52-ton lift crane, or 2-yard shovel.

Always on the go — Wherever there's a heavy load to lift, machinery to install, materials to stockpile, big mobile 545 truck crane is *there* in a matter of minutes — puts all scattered assignments on a fast "work-and-run" basis. Lifts up to 45 tons with 40-foot boom *at 15-foot radius!* Angle indicator on boom, plus reference guide in crane cab, quickly show maximum safe lift capacity for any length of boom and angle of boom being used.

Swinging a skull-cracker in stone quarry, heavy-duty crane pulverizes oversize slabs and chunks of blasted rock. It's a profitable way to speed shovel loading, step up production at the crushing plant. The crane is a Koehring crawler-mounted 305. Truck or Cruiser mounting also available. As a self-propelled Cruiser® crane, the 305 combines one-man operation with travel speeds up to 18 mph — serves several widely-separated mines or work areas. Puts scattered material-handling, lifting jobs on a fast work-and-run basis. Lift capacity? 25 tons at 12-foot radius!

Get more work capacity per dollar of equipment investment — check Koehring before you buy your next excavator or crane.

K16

Doubled Capacity Planned For Waco, Tex., Plant Of Universal Atlas Cement

Capacity of the Universal Atlas Cement Division (U. S. Steel) plant at Waco, Tex., will be doubled by the end of 1961. A second rotary kiln will be installed to increase annual capacity to more than 2,000,000 bbl.

The present plant, built in 1929, produces gray portland and masonry cement and a special oil well cement. Expansion of capacity was necessitated because of the area's increasing cement demands.

Universal has bought 1,937 acres of limestone deposits in the Lime City region southwest of Oglesby, Tex., at an undisclosed purchase price.

Lehigh Valley Cement Producers Attend P.C.A. Safety Conference

Approximately 40 cement executives and workers took part in a Portland Cement Association sponsored safety conference held recently in Allentown, Pa.

Cement firms represented were: Allentown Portland Cement Co. (Evansville and Conshohocken mills), Penn-Dixie Cement Corp. (No. 4 and 6 plants), Dragon Cement Co., Universal Atlas Cement Co., Lehigh Portland Cement Co., Keystone Portland Cement Co., and National Portland Cement Co.

Dr. J. R. D. Brown, P.C.A. safety director, Chicago, represented the association. J. J. Weinerth, superintendent, Penn-Dixie, was conference chairman.

Lightweight Aggregate Added To N.Y. Trap Rock Products

New York Trap Rock Corporation's operations will soon be extended to the lightweight aggregate field, according to Wilson P. Foss, president.

An option has been signed to purchase the business, plant, and real property of the Dennings Point Brick Yard at Beacon, N.Y. The contract is subject to the proving of reserves of shale and clay on the 635-acre property. When this work has been completed, plans will go forward for the erection of a large, modern lightweight aggregate plant, as well as the construction of a modern laboratory.

This new activity, and also expanded research facilities, will be headed by Milton E. Goul, formerly district engineer for the New York State Department of Public Works, who is now vice-president, research and marketing, for New York Trap Rock.

More than $2 million is expected to be spent in the construction of facilities to further the research, development, and manufacture of lightweight aggregate.

Consolidated Rock Products Company has completed negotiations for the purchase of 70 acres of gravel-bearing land near Orange, Calif. Years of operation in Orange County made it necessary to acquire additional reserves. Consolidated also plans to spend $500,000 to modernize its plant and facilities in Orange.

CHIPPER CHARLIE

Never been sick a day in his life. But he knows it can happen to him—so he gets a health check-up every year—just in case. He also supports the American Cancer Society's Crusade. Send your contribution to "Cancer," in care of your local post office.

AMERICAN CANCER SOCIETY

Pennsylvania Associations Hold Joint Annual Meeting To Study Aggregate Rules

To foster a more friendly understanding among competing producers and suppliers, the Pennsylvania Ready Mixed Concrete Association and the Pennsylvania Sand and Gravel Producers' Association held a joint annual meeting with the Bituminous Concrete Association of Pennsylvania, the Pennsylvania Slag Association, and the Pennsylvania Stone Producers Association under the auspices of the Pennsylvania Highway Material Producers Conference.

These joint meetings relieve much of the pressure on state officials to appear as speakers at individual association functions.

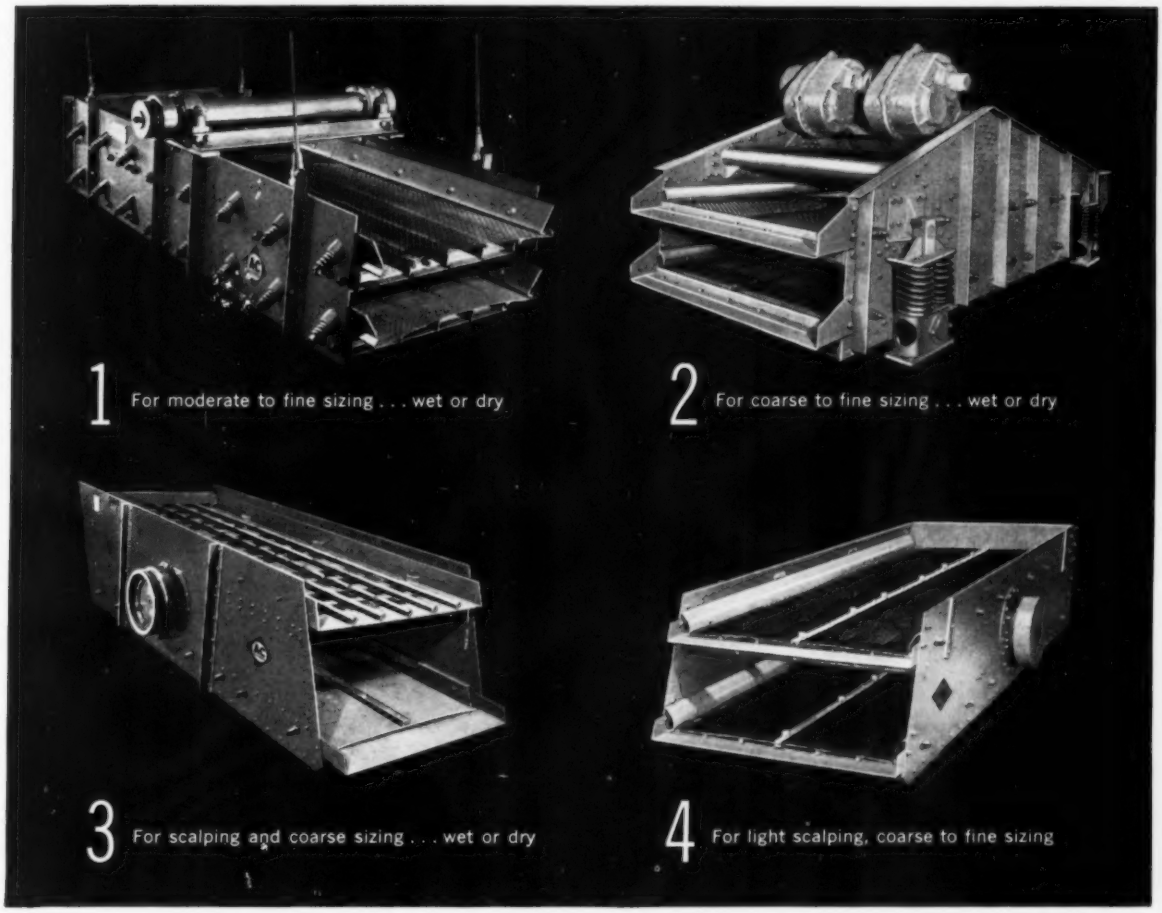
At the first of the two-day sessions, held in Harrisburg, Stanton Walker, director of engineering for the National Sand and Gravel Association and the National Ready Mixed Concrete Association, described the effects of crushed particles in fine aggregates and the relation of water-cement ratio in concrete mixes. This was an especially timely subject as the Pennsylvania State Highway Department has recently issued new fine aggregate specifications.

Later the group heard Dr. Marlin L. Sheridan, professor of engineering, Bucknell University, report on experiments made with various types of gradations of sub-base materials used in highway construction.

New officers of the Pennsylvania Ready Mixed Concrete Association for the coming year are as follows: president, Russell S. Reimer, Houdaille Construction Materials, Inc., Portland; vice-president, Charles A. Nicholson, Centre Concrete Company, State College; treasurer, William Feldman, United Materials Company, Allentown; and executive secretary, Kenneth E. Mayer, Harrisburg.

American Potash & Chemical Corporation, Los Angeles, has announced plans for capital spending of about $25 million during the calendar years 1960-62 for capital improvements. This figure compares with $16,800,000 for the period 1957-1959.

ALLIS-CHALMERS


1 For moderate to fine sizing . . . wet or dry
2 For coarse to fine sizing . . . wet or dry
3 For scalping and coarse sizing . . . wet or dry
4 For light scalping, coarse to fine sizing

Pick a screen to fit your job

. . . be it scalping, sizing, rinsing, washing, or heavy media recovery

Large or small capacity — wet or dry crushed stone, sand or gravel — whatever your application there's an A-C screen for the job. Building the industry's most complete line of horizontal and inclined screens, Allis-Chalmers gives unbiased recommendations — suggesting to you the screen that will do your job at the lowest possible cost consistent with quality.

Built for a beating: There's no skimping on quality at A-C. For example, the frames of Allis-Chalmers screens are carefully machined and *stress relieved* for years of tough usage.

Easy to choose: A helpful screen selection guide has been prepared to help you pick the right model screen for your process. *Contact your Allis-Chalmers representative or write for Bulletin 25B6280. Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada write Canadian Allis-Chalmers, Ltd., Box 37, Montreal, Quebec.*

1 **For moderate to fine sizing** — wet or dry. AVS *Aero-Vibe* inclined screen: Available with wire cloth or perforated plate surfaces. Maximum aperture — 1½ inches. 1, 2 or 3 decks. Sizes 3 by 6 to 5 by 10 feet.

2 **For coarse to fine sizing** — wet or dry, rinsing, or media recovery. *Low-Head* horizontal screen: Saves headroom. Wire cloth or perforated plate. Apertures to 2½ inches. 1, 2 or 3 decks. Sizes 3 by 6 to 8 by 20 feet.

3 **For scalping and coarse sizing** — wet or dry. XH *Ripl-Flo* inclined screen: Wire cloth, perforated plate, rod or stepped grizzly-bar surfaces. Apertures to 10 inches. 1, 2 or 3 decks. Sizes 4 by 8 to 8 by 14 feet.

4 **For light scalping, coarse to fine sizing** — wet or dry, and for rinsing. SH *Ripl-Flo* inclined screen: Wire cloth or perforated plate. Apertures to 5 inches. 1, 2 or 3 decks. Sizes 3 by 6 to 8 by 20 feet.

Aero-Vibe, Low-Head and Ripl-Flo are Allis-Chalmers trademarks.

A-1215

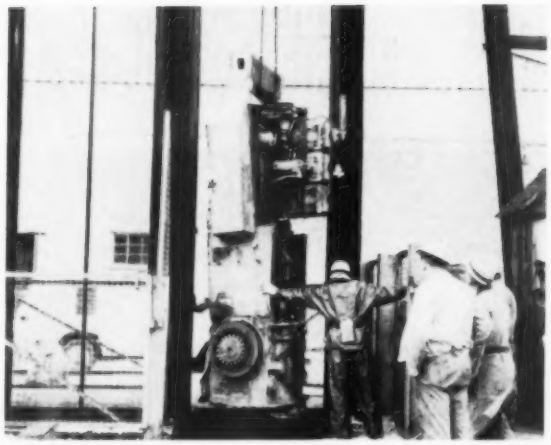
Big Haulers Dismantled For Descent to Salt Mine And Reassembled Below

To move eight 22-ton C Tournapull rear-dump haulers down 975 ft. into the Ojibway Mine near Windsor, Ont., presented quite a problem for the Canadian Rock Salt Company, Ltd. The haulers were too large for the two narrow, vertical mine shafts.

The problem was solved by dismantling the Tournapulls, lowering the sections through the shafts, and reassembling the machines on the mine floor. (See accompanying pictures.)

Ojibway Mine consists of 12 miles of galleries, and the average haul from the mine face to the primary crusher is 1,000 ft. Primary crushed material is raised to the surface in 12-ton loads for final processing and shipment.

The larger-capacity Tournapull units were required to maintain the increasing production of the mine, which is now 5,000 t.p.d. J. E. Crawford, mine superintendent, also uses the electric power from the machines to trigger blasts.



Welders cut the haulers into sections that would pass through the mine shafts, and mechanics reassembled them on the mine floor. (See story in adjacent column.)

Conveyors load blasted rock salt into the rear-dumps, which haul it about 1,000 ft. to the primary crusher. After primary crushing, the salt is raised to the surface for final processing.

California Cement Producers Join Anti-Pollution Research

The cement industry in San Bernardino County (California) recently pledged $50,000 to the long-range anti-air-pollution research program now under way at the University of California at Riverside. The program is to be extended over a six-year period at a total cost of about $1 million, co-operatively supported by industry, agriculture, government, and the university.

San Bernardino County has the following manufacturing plants: Southwestern Portland Cement Co., Victorville; Riverside Cement Co., Oro Grande; California Portland Cement Co., Colton; and Permanente Cement Co., Lucerne Valley.

Lehigh Closes Ormrod Plant—First in Cement Firm's Chain

The Lehigh Portland Cement Company plant at Ormrod, Pa., has been permanently closed, leaving two operating Lehigh plants in this area—one at Fogelsville, and one at Sandt's Eddy, Pa. It was felt that eastern market needs were well met by the two remaining plants.

The Ormrod installation was regarded as obsolete. It was built in 1904 and had not been in operation since 1958. It was the first plant in the Lehigh chain.

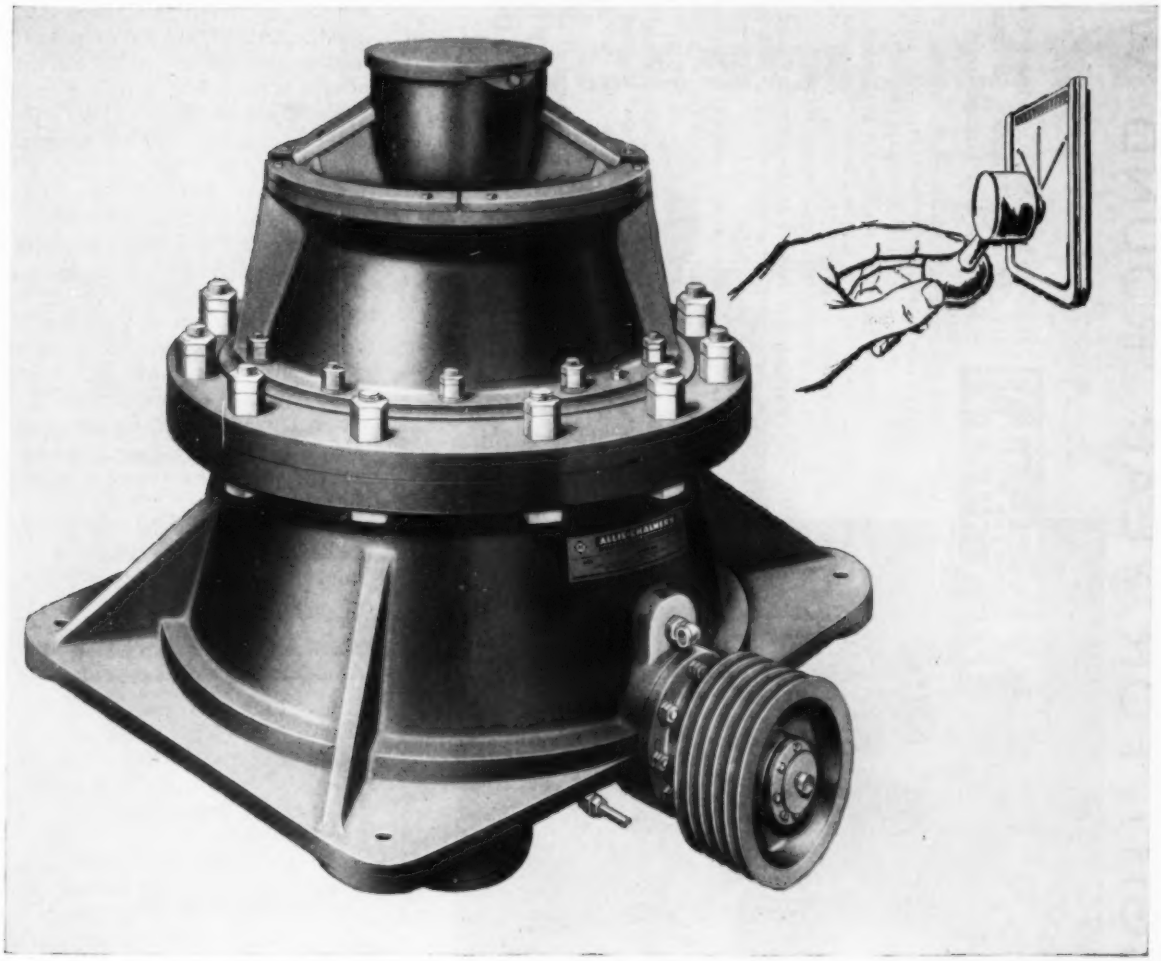
The first mixed gas-fired dolomite kiln of the lime and dolomite calcining plant at the Rourkela Steel Project (India) was lighted late last year. The plant, which consists of three lime kilns and two dolomite kilns, was designed, supplied, and erected by a West German firm.

Medusa Portland Cement Company, though its subsidiary, Crescent Stone Company of Cleveland, Ohio, has purchased another 140 acres of limestone deposits in Pulaski County in southern Illinois. (See PIT AND QUARRY, March, 1960, p. 30.) The purchase price of $66,500 ($475 per acre) is one of the highest land prices recorded in the county.

The Northwestern States Portland Cement Company plant at Mason City, Iowa, is to be enlarged by the addition of 12 storage silos.

IVAN L. TYLER has been appointed research counselor in the Research and Development Division of the Portland Cement Association, thus permitting full-time utilization of his experience and training in concrete technology. He will continue as secretary to the advisory committee to the Long-Time Study of Cement Performance in Concrete, the largest project in which P.C.A. is engaged. PAUL KLIEGER, formerly senior research engineer, succeeds Mr. Tyler in the post of manager of the Field Research Section.

ALLIS-CHALMERS



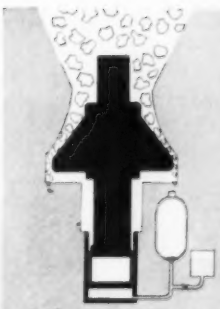
Get any crusher setting at the flip of a switch

1-man, 1-minute product control

Adjustment to product size . . . compensation for wear . . . emergency unloading . . . all of these operations can be done by one man in just one minute with Allis-Chalmers revolutionary *Hydrocone* crusher.

Compare the speed and simplicity of *Hydroset* control with the time-consuming inconvenience of any other method of changing crusher settings — in any other gyratory-type crusher. You'll discover that the *Hydrocone* crusher can actually add hours of production time to your day . . . give you increased tonnage and greater profits by eliminating excessive and costly downtime.

Get all the facts about the *Hydrocone* crusher with *Hydroset* control. See your A-C representative or write **Allis-Chalmers,** Industrial Equipment Division, Milwaukee 1, Wisconsin. A-1240



Hydraulic jack supports cone; crusher setting is controlled by the amount of oil in the jack. A flip of a control switch, conveniently located, positions the cone at any setting.

Hydrocone and Hydroset are Allis-Chalmers trademarks.

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in really cold weather!

Heated Floors Allow Landers & Griffin, Inc. To Keep Working All Year On Route 93 in New Hampshire.

MARION BODIES AND HOISTS

Six Marion units with heated floors from the truck exhaust have made it possible for one contractor to keep going all year in the really cold White Mountain region.

Another six units owned by the contractor but with unheated floors are also on-the-job. All twelve have Model MFR bodies with a capacity of 11 to 12.3 yards. Marion hoists are twin underbody arm type Model HD-88.

Payload performance on the six with heated floors averages 1800 yards per 11-hour shift, traveling both uphill when loaded and in heavy traffic.

The prime contractors, Landers & Griffin, Inc., jointly sponsored with Morrison-Knudsen Co., are building 4.05 miles of Route 93 at an estimated cost of $2.7 million.

Ed Graves, Equipment Supt., says, "We like Marion bodies and hoists very much. We have used Marions for a long time and will continue to do so. The service provided by Marion's Distributor is beyond compare."

If you want to keep going and ahead of schedule, why not see your Marion Distributor or write direct for profit facts.

MARION METAL PRODUCTS CO.
Marion, Ohio, U.S.A.

Enter 50 on card, page 169

White Cement to Be Made At New Crestmore Plant Of American Cement Corp.

A construction contract has been awarded by American Cement Corporation for a $5,000,000 white portland cement facility which will be erected at the firm's Crestmore plant (near Riverside, Calif.). The 250,000-bbl. capacity plant will be completed early in 1961.

Diversified Builders, Inc., Los Angeles, was awarded the construction contract. Production equipment has been ordered from F. L. Smidth & Company, including a 9- by 253-ft. rotary kiln (employing late-model preheaters and automatic control system), and two raw and finish grinding mills (equipped with Symetro Drive and 800-hp. motors). The mills will have a porcelain lining and will utilize porcelain grinding balls.

The plant will be the only facility producing white cement west of the Rocky Mountains.

Work on Ideal's Expansion At Utah Plant on Schedule

A $2,000,000 project at the Devil's Slide, Utah, plant of Ideal Cement Company—designed to provide new storage and bulk-loading facilities—is approaching its mid-1960 completion date.

At Devil's Slide there will be nine new 36- by 140-ft. high storage silos and four interstice bins having a total capacity of 200,400 bbl. Three identical scales, each 10 ft. wide by 170 ft. long, extending under each set of three silos, will permit simultaneous bulk loading of three railcars or trucks. They are the longest scales ever used by Ideal.

The 1960 expansion funds also include the previously-announced expansion at the new Tijeras, N.M., plant. (See PIT AND QUARRY, October, 1959, page 40.) Installation of the second kiln, new raw and finish mills, and related equipment was started on December 1, 1959.

Work is well under way on a $750,000 expansion of storage facilities at the Monarch Cement Company's plant at Humboldt, Kans. The project includes six new silos with a capacity of about 128,000 bbl.

New Consumers Div. Plant Doubles Stone Output—No Added Manpower

The Consumers Division (Chicago) of Vulcan Materials Company has doubled the output of its McCook, Ill., operation with a new $5,000,000 automated crushed stone plant that required no additions to its existing labor force. The 1,600 t.p.h. facility utilizes a complex electronic control system that has raised tons/man-hour substantially.

The plant was built over a two-year period. Production at the site was reportedly never halted during the construction time. Razing of the old plant was carried out simultaneously with construction of the new.

Major Expansions Planned For Canadian Cement Firms

Several Canadian cement manufacturers have either completed plans for plant and capacity expansion, or contemplate such plans.

Inland Cement Company has announced a 1,500,000-bbl. expansion of its facilities at Edmonton (Alberta province) and Regina (Saskatchewan province). The Edmonton plant, which went on stream in 1956, will get a 1,000,000-bbl. boost to an annual capacity of 3,000,000 bbl. The 1,000,000-bbl. capacity Regina plant, acquired from Saskatchewan Cement Corporation in 1957, will receive a 500,000-bbl. expansion. Inland is a subsidiary of Sogemines, Ltd.

Sogemines Ltd., the Canadian branch of a Belgian industrial investment group, is reportedly considering long-range plans for a $15,000,000 plant near Montreal.

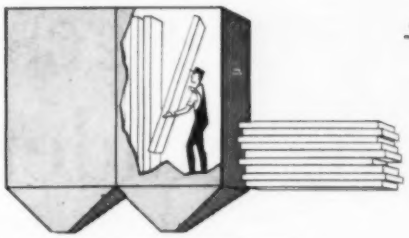
British Portland Cement Company, London, Eng., is also reportedly planning a $15,000,000 plant, to be located near Cobourg, Ont.

And Montreal-based Miron & Freres Ltd., a contractor and one of Canada's major ready-mix and concrete unit manufacturers, has completed its own cement plant in that city. It is rumored to have cost about $30,000,000, and annual capacity is approximately 4,000,000 bbl.

Total installed capacity in Canada to date is close to 48 million bbl. (a Canadian barrel is 350 lb.) against an indicated consumption of 36 million bbl.

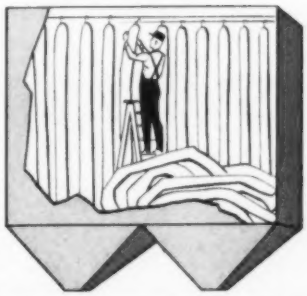
SINCE 1870 SLY

SLY DUST FILTERS For ACCESSIBILITY



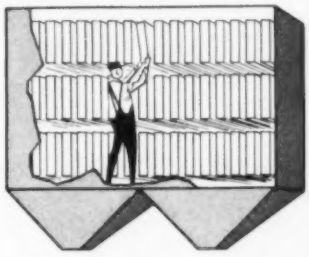
1900's
SLY DUST ARRESTER

Every cloth screen from the end of the arrester had to be removed to reach the faulty screen.



1930's
SLY TUBE-TYPE FILTER

To replace a tube required at least partial disassembly of every other tube in the way.



TODAY
NEW SLY
"ROLL-CLEAN"
DYNACLONE®

Any filter bag is easily accessible and can be replaced without need for removing others.

NEW SLY DYNACLONE PROVIDES FASTEST, EASIEST BAG CHANGING

Whether you change one bag, or the entire filter, you do it in less time with the Dynaclone. Quick replacement of individual bags eliminates the need for costly rebagging should only a few be worn. Complete change is also fastest . . . the Dynaclone has only one half as many bags as other filters with the same cloth area. In addition . . .

New "Resist-O-Wear" bags offer 200 to 300% more bag life.

The Dynaclone operates continuously. It provides complete dust suppression through constant suction.

The Dynaclone is automatically self-cleaning by reverse air. A single exhaust fan provides *both* suction for dust collection and air for bag cleaning. No auxiliary blowers required.

And the Dynaclone provides 20 to 40% more cloth in a given space than other makes of dust filters.

The Dynaclone has been proved in more than 1,000 installations. Investigate its advantages on your applications . . .

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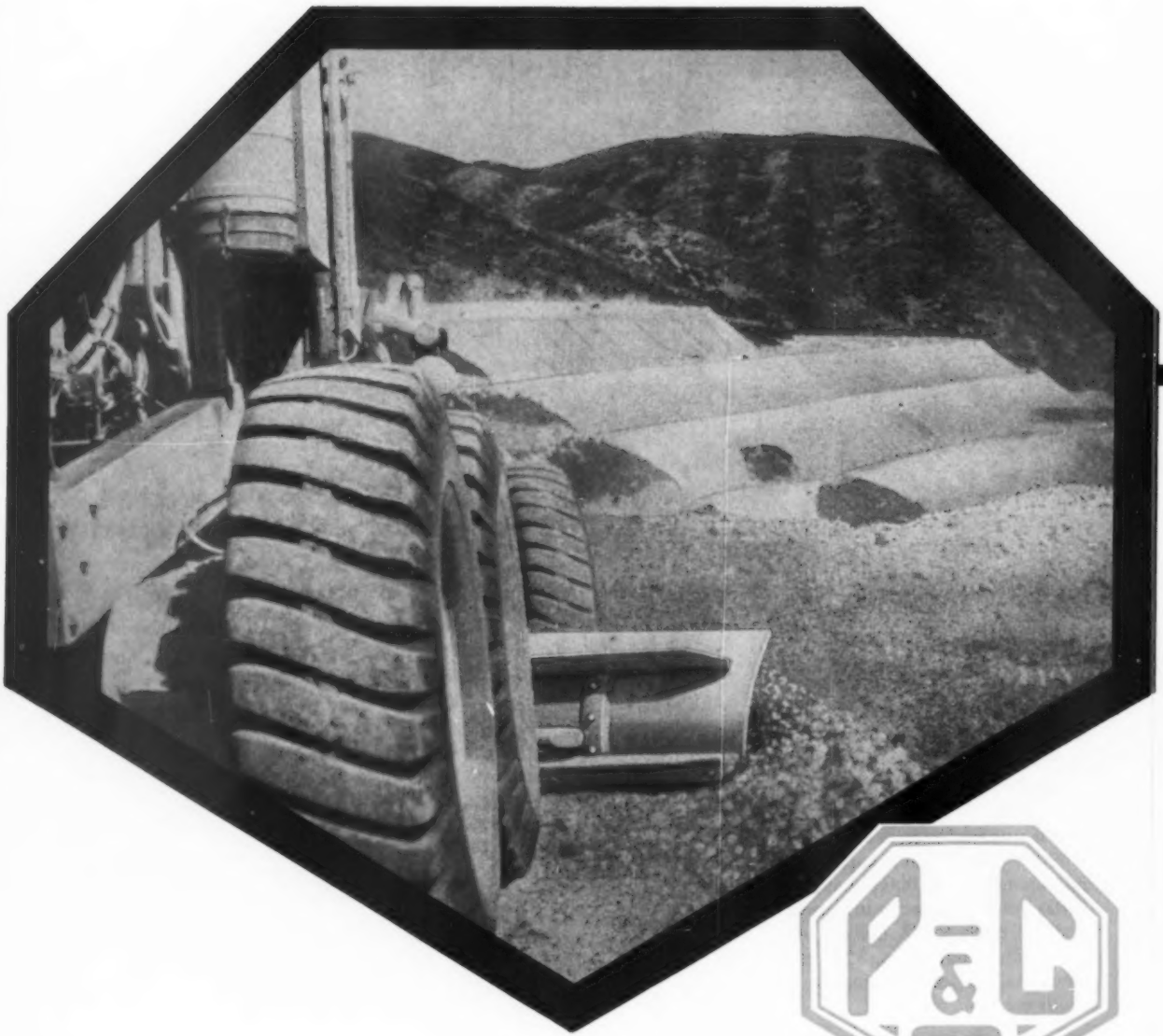
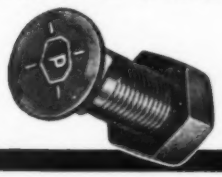
World's largest copper mine speeds production with world's strongest, longest wearing grader blades



PACAL X-TRA EDGE BLADES

The new Pacal X-Tra Edge Blades wear two and a half times longer than any blades previously used by Western Contracting in mining development work for Kennecott Copper Corp., Bingham Canyon, Utah.

Pacal X-Tra Edge Blades are heavier, stronger . . . wear longer . . . stay sharper . . . offer less waste per hour of work. The steel in Pacal Blades is rolled to an exact analysis. The correct amount of each element is included to give you the best combination of wear and strength. Pacal X-Tra Edge and "Dig-in" End Blades give you more steel on the wearing edge and reduced waste and down time. Write or CALL PACAL!



Pacal Heat Treated Plow Bolts will not loosen or stretch. Heads will not wear off. This extra strength and longer life is necessary when long wearing Pacal X-Tra Edge Blades are used.

Western Contracting use ⅝" to ⅞" x 8" Pacal X-Tra Edge Blades. Outwears ordinary blades up to 6 times.

Available in ½" to ¾" x 8". Either size can be used in two or three piece arrangement.

Pacal Dig-In End Blades work easier, wear longer, cut costs in dozer operations.

All steels furnished by Pacal made in U. S. A.

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Circular B-82

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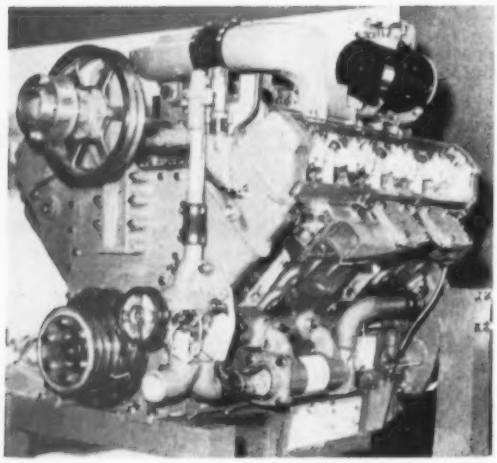
Two New V-8 Diesel Engines Now Available for Heavy-Duty Use



This naturally-aspirated V-8 diesel engine was one of a pair of new-design engines introduced to the industry in Chicago last February by Cummins Engine Company, Inc.

Cummins Engine Company has announced the availability of two new, V-8 type diesel engines for use in scrapers, dozers, front-end loaders, hoists, shovels, rock crushers, rear-dump trucks, and bottom-dump trucks.

These two engines, the naturally-aspirated V8-350 and the turbocharged VT8-430, are rated at 350 hp. and 430 hp., respectively, and operate at maximum speed of 2,500 r.p.m. Piston displacement of each engine is 950 cu. in.

"The V8-350 and the VT8-430 are introduced after many years of design, development, and field testing," said C. R. Boll, Cummins vice-president-sales at a special press conference. "The 350 hp. naturally-aspirated model V8-350 is designed specifically for applications in construction machinery and heavy-duty on- and off-highway haulage where there is a need for a large displacement, rugged, naturally-aspirated engine. The V-8 design makes it possible to furnish an engine of this displacement in a package shorter than present 6-cylinder, smaller displacement engines."

The new V-8 engines have a 90 deg. angle between the cylinder banks. Accessories, such as air compressor, fuel pump, lube oil filter, fuel oil filter, and generator are located on top in the V for easy accessibility. The engines utilize an exclusive Cummins PT (pressure time) fuel injection system. The fuel pump delivers fuel to the injectors *via* passages drilled through the cylinder head, thus eliminating external fuel lines and screw thread connections to the injectors. Since there are no connections to the injectors, maintenance labor required for their inspection is reduced.

All lubricating oil lines are drilled passages in the cylinder block, eliminating all the external aircraft-type hose used on previous designs. Full pressure lubrication to all bearing surfaces is furnished by a gear pump located in the lower crankcase. All V-8 engines are equipped with air-compressors.

Cylinder block heads are of cast iron, and low-stressed items such as oil pans, air manifolds, etc., are of aluminum.

One cylinder head serves each bank of cylinders. Design includes two intake and two exhaust valves for each cylinder, to assure maximum efficiency. On naturally-aspirated engines, the exhaust manifolds may be placed either on the outside or inside of the V, as required by the installation. Ample provision is made for additional accessory drives from the timing gear train, which is located at the rear of the engine.

Both the V8-350 and the VT8-430 are four-cycle engines. The naturally-aspirated V8-350 weighs 2940 lb., or 8.4 lb. per hp. with standard accessories. This compares to 11 lb. per hp. for present Cummins naturally-aspirated in-line engines.

The turbocharged VT8-430 weighs 2970 lb., or 6.9 lb. per hp with standard accessories. This compares with 7.4 lb. per horsepower for present turbocharged in-line engines.

Obsolescence, Slack Market Force Closing of Plants

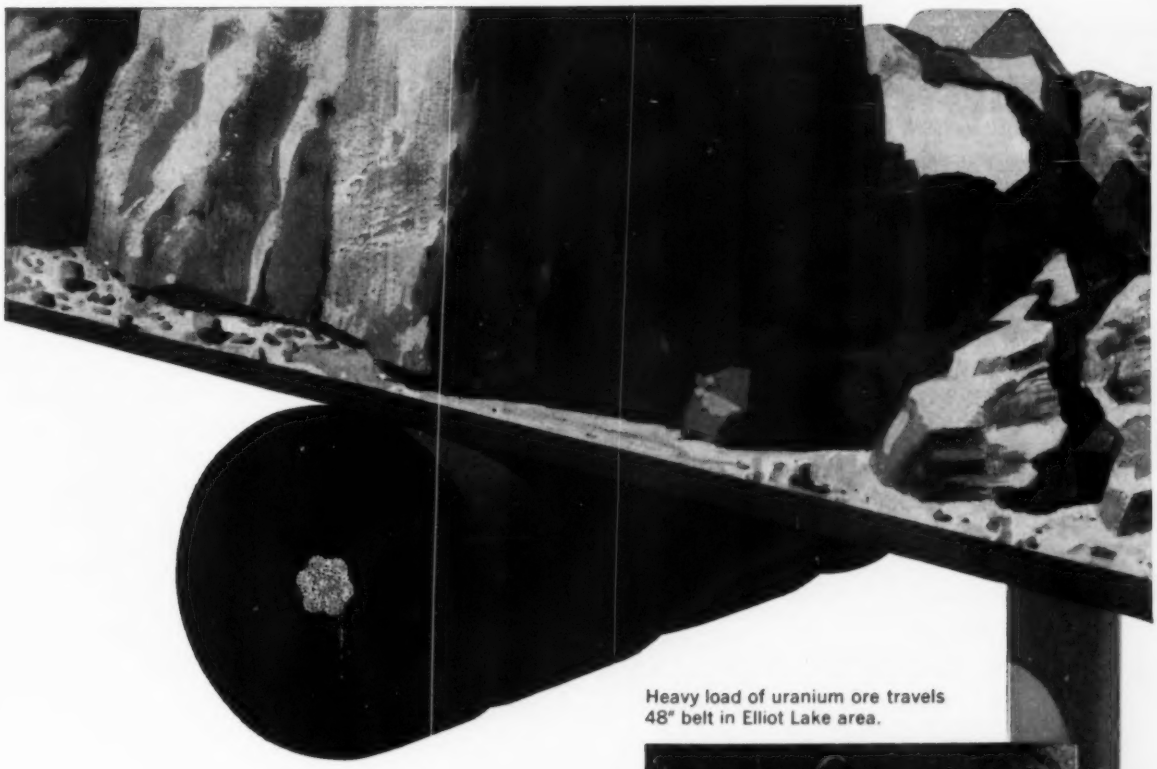
Two firms in the nonmetallics minerals field are closing down operations at two plants due to obsolescence of the installations.

Texas Gulf Sulphur Company has suspended operations at its Nopalpa, Mex., mine because it was less efficient than other, larger units. The facility has produced about 100,000 tons of sulphur annually since production began in 1957.

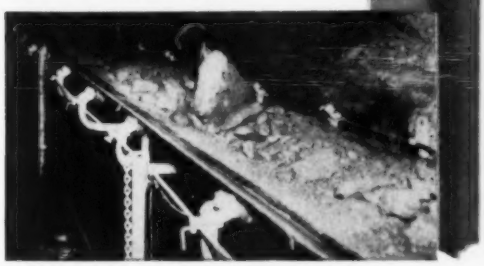
American Cyanamid Company has announced the closing of its industrial explosives plant at Grafton, Ill. A slack market for nitroglycerin explosives and obsolescence of the plant were the reasons noted for the shut-down.

The Flintkote Company has acquired all of the issued and outstanding stock of King Paving Company, Ltd., a large Canadian road construction company. The acquisition also includes King Paving's wholly-owned subsidiaries, Nelson Crushed Stone, Ltd., and King Building Materials, Ltd., which market commercial limestone and ready mixed concrete in the Toronto-Hamilton area.

Despite a mid-season slump created by the steel strike last year, Great Lakes bulk freight transportation was in larger volume than during 1958. Limestone shipments showed the most marked increase, with 26,159,660 net tons, a 17 percent increase over 1958. Limestone ranked third on the list of Great Lakes tonnages shipped.



Heavy load of uranium ore travels 48" belt in Elliot Lake area.



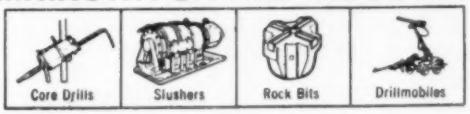
LIMBEROLLER® CONVEYOR IDLERS ABSORB "BUMP"—INCREASE BELT LIFE

Joy Limberoller Conveyor Idlers increase belt life because the "bump," which is a prime source of belt wear, is harmlessly absorbed. Unlike steel idlers, which are rigidly mounted and unyielding, Limberoller idlers carry the belt on resilient neoprene discs which are moulded to flexible wire rope. The two ends of the wire rope are locked in bearings which are free to turn in the yokes which support them. This type of construction is strong, yet it permits enough "give" in the idler to eliminate the punishing "bump" as the belt hits the idler. This flexibility also improves belt training.

Limberoller idler design not only increases belt life, but can give the idler up to ten times the service life of steel idlers. Bearings are placed up out of the way of spillage, which is particularly important when handling abrasive materials. The neoprene discs are corrosion resistant, and they are self-cleaning with even the stickiest of materials. Lubrication and servicing is easy, because the bearings are completely clear of the belt.

For complete details on how Joy Limberoller idlers can reduce your cost-per-ton in handling any bulk materials, write for Bulletin 1172-26.

EQUIPMENT FOR MINING ... FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

Industry Personalities

JACK P. THOMAS has been appointed production manager for the sand and gravel operations of Wesco Materials Corporation and Trinity Sand & Gravel Company. He was previously general superintendent at gravel plants in Ferris and Corsicana, Tex.

GLENN E. PIKE is now in charge of the public relations department of Wesco and all its subsidiaries. This unit was added to the three others that he heads: personnel, safety, and insurance. Mr. Pike initiated the safety programs at Wesco.

R. B. Martin

ROBLEE B. MARTIN, general manager of the Dundee Cement Company, has been given the additional responsibility of the vice-president's post. For the last year he has been general manager. During that time he has supervised the construction the $25,000,000 plant, and the organization of the company in preparation for full-scale operations.

JOHN O. HOBBS has been named manager of building materials sales for the Standard Lime and Cement Company, a division of American-Marietta Company. He had been formerly assistant manager, serving under R. J. Troja, vice-president, since 1956.

RICHARD M. BILGER will succeed Mr. Hobbs as assistant manager of building material sales.

MERRILL L. NASH has been elected president and chief executive officer of the Livingston Rock and Gravel Company, Arcadia, Calif. He has also been named a director and general manager of Triangle Rock Products, Inc., also of Arcadia. He had been a vice-president and treasurer of a Los Angeles engineering and construction company.

TERRENCE C. ELLIS has been elected treasurer for both firms. They are major suppliers of ready mixed concrete, sand, and gravel in southern California.

E. W. Adams

C. E. Lindsay

E. WALTER ADAMS has been appointed manager of operations, eastern area plants, for Kaiser Refractories & Chemicals Division. CAREY E. LINDSAY has been named production manager for these facilities.

Mr. Adams has been serving as plant manager of the company's basic refractories plant at Columbiana, Ohio, a position he has held since the plant was built in 1955.

Mr. Lindsay was formerly general superintendent of the clay and silica refractories plants at Niles, Ohio; Frostburg, Md.; and Van Dyke, Pa.

ROBERT W. FORT was named vice-president in charge of finance for Medusa Portland Cement Company, succeeding P. G. DAWSON, who has retired. Mr. Dawson continues as a director of the company.

ATTENTION!

Administrative and Production Executives—see page 166 for information about how to reserve your copy of the *1960 PIT AND QUARRY HANDBOOK*.

H. Fleming

HARLEY FLEMING has been named superintendent of the Texas Industries, Inc., cement plant now under construction at Midlothian, Tex. He has been production manager of Ideal Cement Company's southern division at Houston for the last 13 years. Completion of the 1,400,000-bbl. plant is scheduled for the end of this year.

MARCUS S. WRIGHT JR., founder and chairman of the South River Sand Company, Old Bridge, N.J., recently retired. The new officers are: RUDOLPH B. MILLER, chairman; MARCUS S. WRIGHT III, president; A. ARTHUR POPE II, vice-president and secretary; and WALTER O. WRIGHT, treasurer.

RALPH YEAMAN has been elected secretary-treasurer of the new Hawaiian Cement Corporation, whose plant is nearing completion at Barber's Point, Oahu, Hawaii.

K. T. "CHARLIE" MAU has been named general superintendent of the new plant. He formerly was director of research and development, and manager of chemical sales for Gaspro, Ltd., one of the owners of Hawaiian Cement.

DANIEL P. JENNY has been appointed to the staff of the Expanded Shale Clay and Slate Institute at the Washington, D.C., offices. For the last 10 years he has been a structural engineer with the Portland Cement Association.

THEODORE PRICE has been named director of advertising and publicity for Lone Star Cement Corporation. He was formerly supervisor of the Lone Star advertising account at Donahue & Coe, Incorporated.

JOHN P. FLYNN has been appointed advertising manager for Lone Star. He was formerly assistant publicity manager. Mr. Flynn is also a former staff member of PIT AND QUARRY.

Most Complete Line Ever!

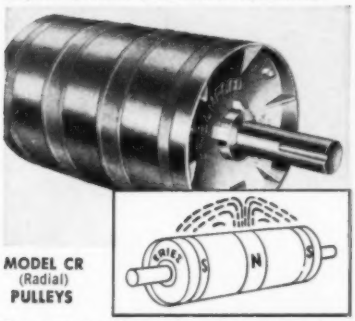
ERIEZ

permanent non-electric Erium-powered*

MAGNETIC PULLEYS

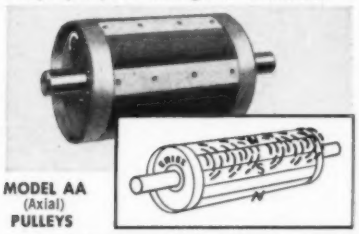
Now in 2 "duty-rated" designs—to give you the finest automatic separation for your exact application—fine iron or tramp iron removal.

NEW, EXPANDED LINE! New design, new magnetic efficiency permit increased operating range and effectiveness with 2 different magnetic actions. Peak protection for all operations —from rugged crusher protection through delicate product purification operations.



MODEL CR (Radial) **PULLEYS**

For removing large pieces of tramp iron from heavy depths of flow. Provides a strong, deep magnetic field of equal intensity around the full periphery. 12" through 36" diameters.



MODEL AA (Axial) **PULLEYS**

Excellent for nne iron separation, as well as small and medium pieces of tramp iron, in average material flows! Strong magnetic field of equal force extends across the full width of the pulley. 8", 12", 15", & 18" diameters.

Prevent product contamination, machinery damage, fires, explosions, downtime. 2 designs, 4 magnetic strengths, 8 diameters, 14 belt widths. No operating or maintenance costs. For all materials, wet or dry, on belts of non magnetic material. Fast, simple installation.

**Erium* —an exclusive, high quality permanent magnetic power source specifically designed and energized by Eriez.*

Eriez Mfg. Co., 113-DA Magnet Drive, Erie, Pa.

New fact-filled 6-page bulletin has installation photos, selector guide, etc. Write today!

ERIEZ

Enter 57-A on card, page 169

TOM L. ROBINSON, Missouri Valley Limestone Company, Inc., Oakland, Iowa, was re-elected president of the Iowa Limestone Producers Association, Inc., at the end of its 15th annual convention.

JOSEPH A. MADLOM, Madlom Brothers, Edgewood, was named vice-president.

LESTER CROWN and FRANK NUGENT have been elected vice-presidents of General Dynamics Corporation. Mr. Crown is vice-president of Material Service Division of General Dynamics, and president of Marblehead Lime Company. Mr. Nugent is president of Freeman Coal Mining Company, a Material Service subsidiary. COL. HENRY CROWN, chairman and chief executive officer of Material Service, was elected to the General Dynamics board of directors in February. The two firms merged last December.

FRANCIS J. PAPSO has been named assistant to the merchandising manager of wool products and prefabricated homes and assistant to the merchandising manager, insulation board products for the Flintkote Company. He replaces HOWARD GRAHAM, who was recently named assistant to the marketing research director.

WILLIAM T. YOUNG has been named Ohio sales division manager for Huron Portland Cement Company. He will have headquarters in Cleveland.

J. W. LOWE has been appointed consultant for promotion and new development at Southwestern Portland Cement Company in El Paso, Tex. Prior to joining Southwestern, he was a member of a San Antonio contracting firm, and had charge of the prestressed concrete runway project at Biggs Air Force Base.

ELDON LANE has been elected a vice-president of the Stewart Sand and Material Company, Kansas City, Mo. Prior to this promotion, he was general superintendent.

WILLIAM A. BROOKS recently retired as district sales manager of the Alpha Portland Cement Company plant at Ironton, Ohio. He had served the cement industry for 38 years.

WRITE FOR FACTS ON NEW

ERIEZ

HI-VI

electro-permanent magnetic

HEAVY DUTY

BIN VIBRATORS

(Pat.)

New, *heavy-duty* units for bins up to ¼" wall thickness and 50 cu. ft. capacity • Enclosed drive element is furnished as *standard;* dust and weather resistant for greater efficiency • Exclusive pinpointed vibration impact • No rectifier needed—operates directly off A.C. line • Low operation and maintenance costs • Electro-permanent magnetic drive • Assures steady materials flow from bins; eliminates arching, bridging, sticking.

Special Mill Mutual accepted units for hazardous, dusty locations. Impact or semi-noiseless models.

Eriez Mfg. Co.

113-DB Magnet Drive, Erie, Pa.

Please mail literature on heavy duty bin vibrators to:

NAME_____

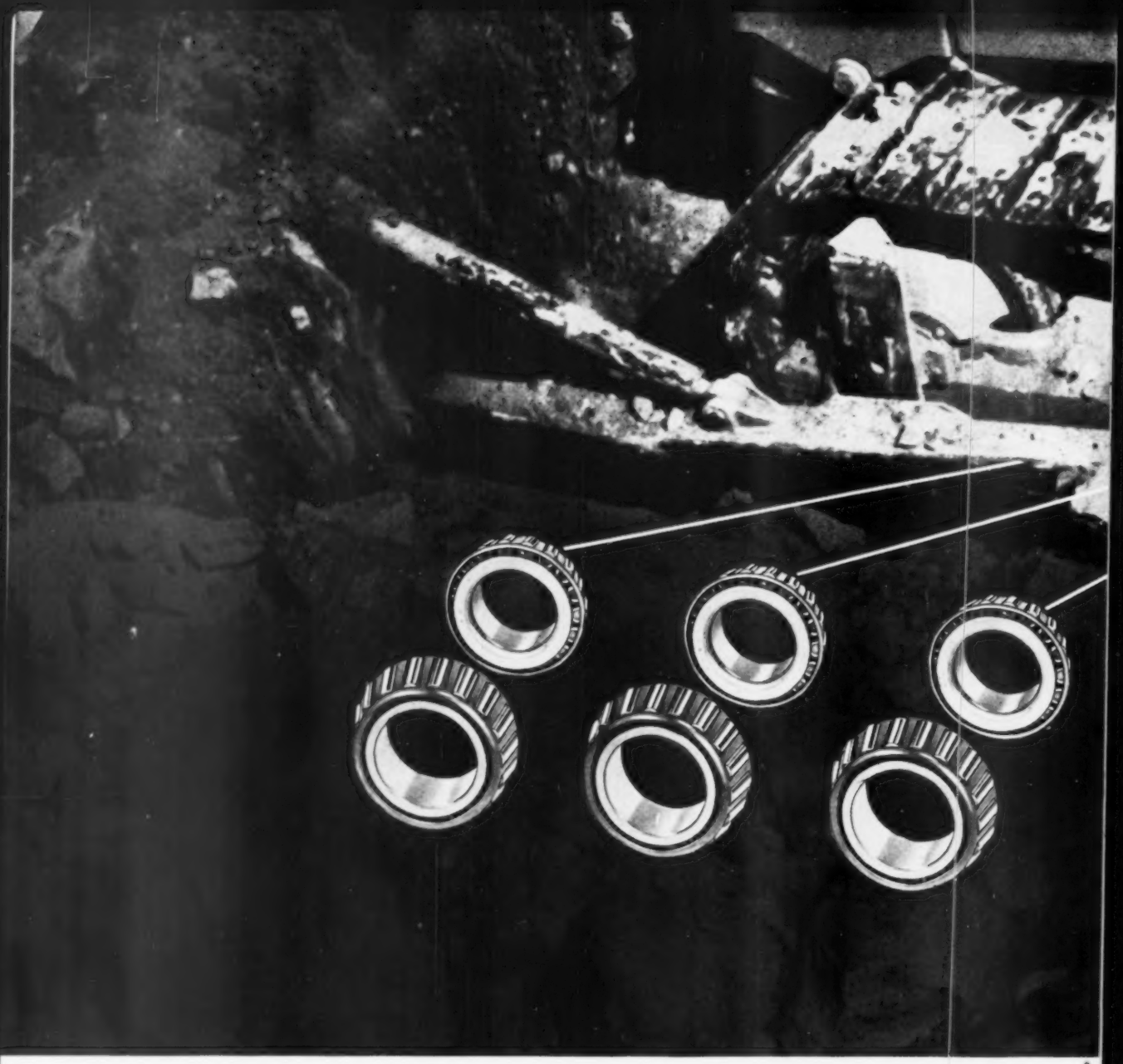
COMPANY_____

ADDRESS_____

CITY_____ STATE_____

ERIEZ

Enter 57-B on card, page 169



MORE WORK POWER

Reduced friction through use of tapered roller bearings in all Allis-Chalmers crawler tractors makes the difference in work power and profit for you!

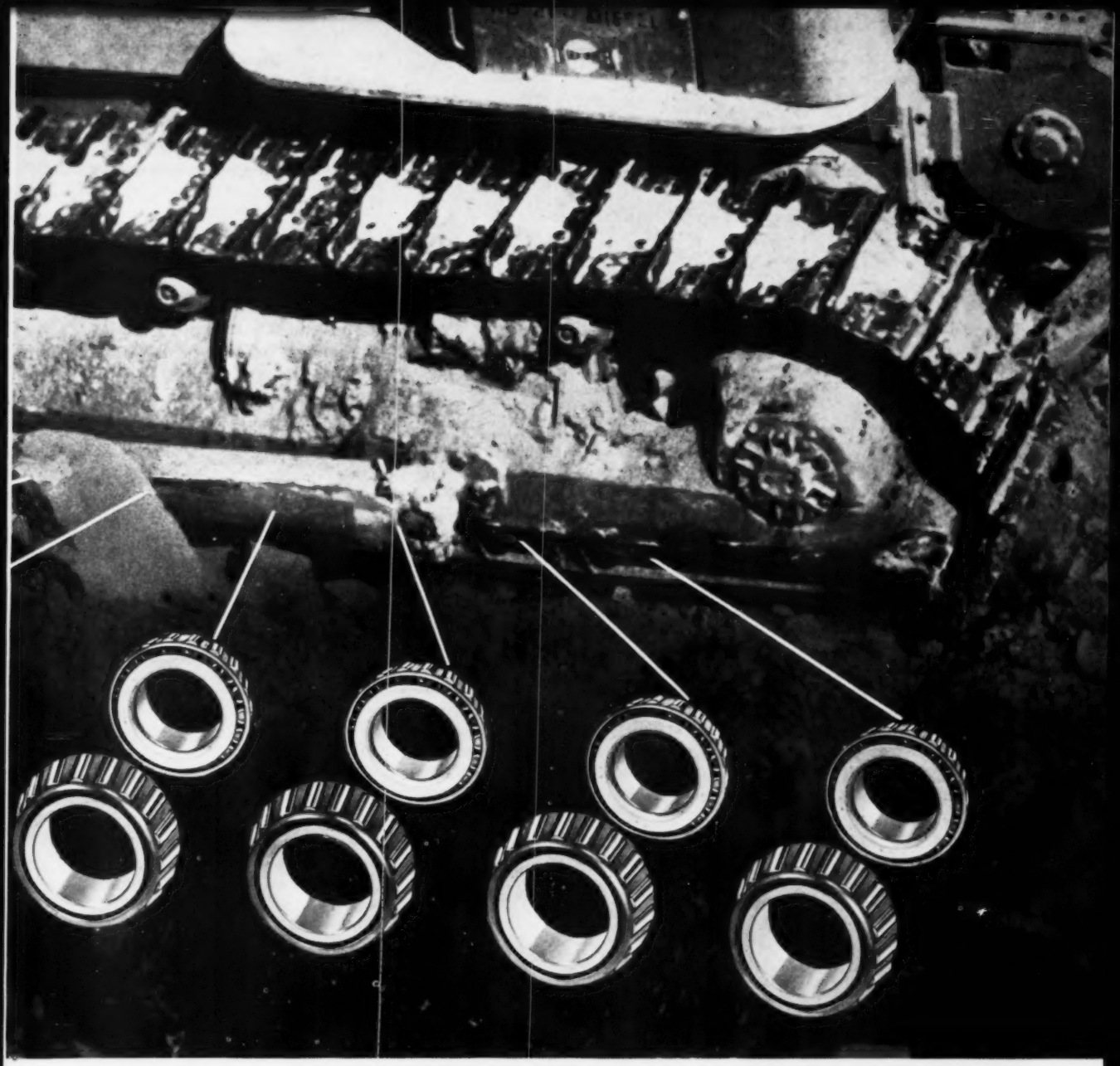
All Allis-Chalmers crawler tractors roll on tapered roller bearing truck wheels. Most others still use bushings.

Anyone who remembers his roller skating days knows the performance advantages of bearings over bushings. The difference between first and also-ran was in the wheel bearing. This friction-reducing advantage is the reason railroads all over the country have turned to *roller* freight.

The same principle applies to tractors except much more power is being wasted by friction-type plain bushings. It's one of the reasons the 225-hp HD-21, on tapered roller bearings, produces right alongside the biggest tractors you can buy. Can you

Enter 58 on card, page 169

move ahead with



PER HORSEPOWER

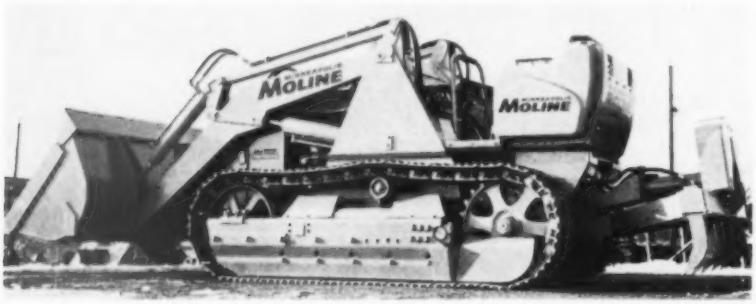
continue to pay for power that *never* produces—that gets "lost" in old-fashioned bushings?

Your Allis-Chalmers dealer will be glad to discuss this and the many other advantages that keep the HD-21 on the go shift after shift with a minimum of maintenance. Ask about the *toughest track ever built* . . . the *industry's healthiest engine* and *certified permanent lubrication*. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

ALLIS-CHALMERS

power for a growing world

new machinery



● A new 59-hp. crawler-tractor, the "MoTrac," has been announced by the Minneapolis-Moline Company, Hopkins, Minn.

With torque converter and full power reversing shuttle, the crawler has five forward speeds ranging from 1.3 to 7.25 m.p.h., and a 25 percent increase in five reverse speeds up to 9.07 m.p.h. The 4-cylinder Moline engine delivers 59 hp. at 2,000 r.p.m. on gasoline, and 53 hp. at 2,000 r.p.m. on diesel engines.

The "heel-and-toe" forward-reverse direction "Hydro-Shuttle" feature frees the operator's hand for full attention to operating attached tools.

Planned for the general contractor, the 5-roller crawler is of all-steel forged and welded construction. Street plates or grousers of 14-in. width are standard equipment, and optional in 12-in. and 16-in. widths. **(350)**

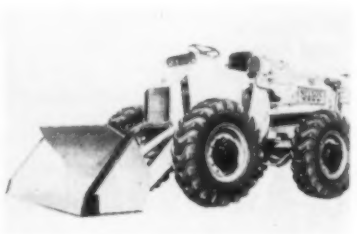
● Ripco Air Systems has developed a quick-attaching railroad hopper car unloader which the company reports can be installed in less than two minutes. Installed on any standard hopper car and used in conjunction with a Ripco Air System, the unit can unload cement and any other similar material at rates up to 30 t.p.h.

Reloading the car is also possible with the Ripco system. By reversing the method, material can be sucked from the bins and reloaded into the hopper car. **(351)**

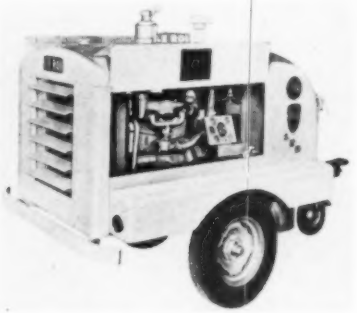
● The N. P. Nelson Iron Works has added to its line a $\frac{5}{8}$-cu. yd. capacity tractor shovel known as the Model 150.

Maximum dumping height under the bucket edge is 9 ft. Forward reach at 7-ft. dumping height is 5 ft. 2 in. Bucket tipback at ground level is 40 deg.

Features of the Model 150 include Allison Torqmatic full reversing transmission with 3.5:1 stall ratio; three speeds forward and reverse, ranging from 3.3 to 27 m.p.h.; and four-wheel-drive planetary axles with torque proportioning differential. A choice of gas or diesel engine is offered. **(352)**



● New features on the portable rotary compressor, model 125RG2, have been announced by the Le Roi Division of Westinghouse Air Brake Company. No price increase was indicated.



Three safety features added to the 125 c.f.m., gasoline-driven, two-stage unit include: (1) cutoff switch that automatically shuts down the compressor if oil pressure drops too low; (2) automatic dump valve that instantly releases air pressure in the receiver when the compressor is shut down, thus eliminating oil back-up into the air-end; (3) non-wearing orifice, located in receiver outlet, which assures proper air-end oil cooling by holding 40-lb. pressure in receiver. **(353)**

● Boston Woven Hose & Rubber Company, a division of American Biltrite Rubber Company, Incorporated, is offering an incline conveyor belt, Dur-A-Lift, designed for carrying objects up an incline as steep as 45 deg.

The top cover consists of parallel, transverse, inverted "V" ridges of wear-resistant Dulon. The deep self-cleaning ridges reportedly assure maximum grip action. The belt, of Boston's equalized ply stress, is available in 3- or 4-ply 28-ounce duck. It is stocked in 48-in. wide rolls 500 ft. long, and it can be cut to other widths. It can also be manufactured with molded edges. **(354)**

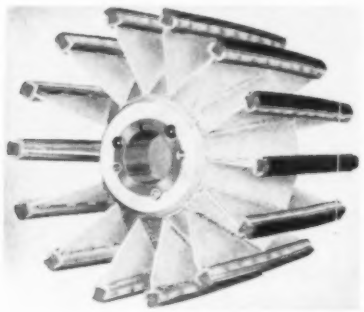
and equipment

for further information use card on page 169

● A rubber-lagged Turn-Clean® wing pulley has been introduced by Van Gorp Manufacturing, Incorporated, Pella, Iowa. It is reportedly the first lagged wing pulley offered.

The exterior edge of the wing consists of a U-shaped steel channel which receives a steel-encased rubber bar. The latter provides a surface which transmits maximum traction to the belt. The rubber lagging is an individual, separated strip, compressing on contact with the belt. When the arc of contact is broken, the rubber springs back to its normal height and cleans itself. The rubber bar grips the belt tightly and spalls off dried material on the underside of conveyor belts, eliminating shutdowns.

Its greatest use is expected to be in highly automated conveying systems handling sticky materials or types that build up on belts and pulleys. **(355)**



● The Flexaust Company, division of Callahan Mining Corporation, New York, N. Y., has made available the Duraflo hose, for materials handling by gravity flow.

The natural rubber inner liner, combined with the neoprene-coated fabric of the outer cover, results in flexibility and resistance to abrasion. The piping, wire reinforced to maintain capacity on bends, is available in 2-in. to 10-in. i.d. Prices and further details are given in Bulletin #601. **(356)**

● The new Lectra Haul, a 55-ton pay load diesel electric truck manufactured by Unit Rig & Equipment Company, Tulsa, Oklahoma, was demonstrated recently at a stone quarry near Tulsa.

The Lectra Haul was loaded with 55 tons of limestone and driven up a 6 percent grade at 8 m.p.h. The entire load was dumped in 23 seconds by means of hydraulic rams. The vehicle is designed to take grades up to 15 percent with a full load.

The off-highway truck, designed for open-pit haulage, incorporates the General Electric motorized wheel drive.

Each wheel has its own integral motor and gear drive arrangement. The motor is mounted within the rim, which in turn is bolted to the side of the vehicle. Electric power for the motorized wheels is supplied from a generator driven by a 600 hp. Cummins VT-12 engine. Use of the vehicle is expected to cut hauling costs from 10 to 30 percent.

During the demonstration the 41-ft. long Lectra Haul demonstrated its maneuverability in turning in restricted areas by making figure 8's in the same tracks as a conventional 15-ton dump truck with about one-fourth the Lectra Haul's capacity. A roadway 50 ft. wide is sufficient for the truck to make a 180-deg. turn.

After leaving the bottom of the pit, the truck was run at a high rate of speed and the gross weight of 110 tons was brought to a fast stop before the spectators. This stop demonstrated the holding power available with electric motors for braking. Parking and emergency brakes use hydraulic aircraft disc types on all four wheels.

All parts requiring periodic maintenance are easily accessible.

The motorized wheel drive design, eliminating torque converters, transmissions, propeller shafts, and drive axles, reduces drive system maintenance. **(357)**

● Caterpillar Tractor Company, Peoria, Ill., announced its new line of wheeled Traxcavators at a series of meetings in New York, Chicago, and San Francisco. A movie, demonstrating the performance characteristics, was shown, and a side-trip to Aurora was an adjunct of the Chicago meeting.

First model available is the Cat No. 944 Traxcavator. The result of several years of planning and design, this unit embodies a number of new sefety and production features.

All lift arms and hydraulic cylinders are located ahead of the operator's compartment.

Powered by either gasoline or diesel engine, the No. 944 is fitted with a 2-cu. yd. capacity bucket as standard equipment. Both types are rated at 105 net hp. Maximum rating of the D330 diesel engine is 135 hp.

The productive ability of the unit results from the combination of power-shift transmission, which permits quick shifting into forward or reverse gear; a newly designed high-capacity hydraulic system that delivers power during critical loading phases; and machine stability under all conditions.

Dumping reach is 31¾ in. at maximum height and maximum dumping height is 9 ft. 2 in. The combination of reach and height is planned to give precise and fast load-spotting for dumping into trucks or other vehicles.

Front tires are the farthest forward portion of the machine, which eliminates the risk of loading damage.

The power train of the No. 944 Traxcavator includes a power shift transmission, which is a 2-speed forward, 2-speed reverse, planetary transmission. It consists of four in-line gear trains, each with a separate clutch. Two of the planetary trains provide directional control, while the other two provide gear speed selection. The power train also includes a manually shifted range selector transmission, which provides the machine with a 4-wheel-drive work range, or 2-wheel drive travel range.

Incorporated in the direct-acting hydraulic control system is a pressure-modulating relief valve, which assures smooth shifts by applying gradually increasing pressure to clutch plates.

Use of a hydraulic safety valve in

the transmission control unit shifts the transmission into neutral if oil pressure drops, or the tractor is shut down.

The two air-boosted foot-brake pedals are suspended from the compartment forward wall to retain a clean deck area. The left brake contains a neutralizer valve, which shifts the transmission's directional control into neutral when 40 p.s.i. brake pressure is applied. The right brake works as a conventional brake pedal, having no interaction with the transmission. The steering system is hydraulically boosted.

The bucket is of welded construction, with a self-sharpening cutting edge, and wrap-around corners on the cutting edge.

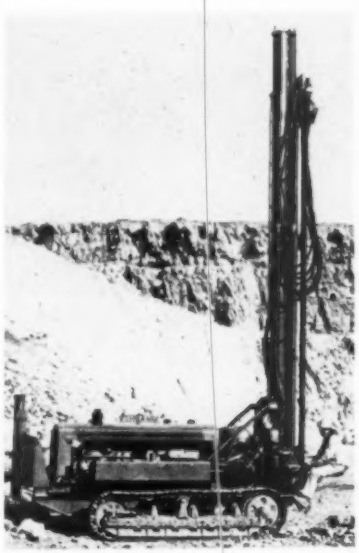
Hand removal of the engine side panels facilitates routine engine servicing. Fenders extend along the sides of the engine and serve as working platforms. The unit's front guard consists of seven bolt-on pieces which are easily removed for servicing the lift cylinders, hydraulic manifolds, and brake master cylinder. The seat can be tipped forward to provide access to the transmission filter, control valve, and loader pump, as well as for control linkage adjustment.

Caterpillar has a complete line of Traxcavator attachments: a side dump bucket with a 2-cu. yd capacity, an extra counterweight group for use with the side-dump bucket, a light material bucket with a 3-cu. yd. capacity, a 2-cu. yd. quarry bucket, and bucket tooth groups having replaceable tooth tips. Also offered is a fiber glass cab with wide entry doors, windshield wipers, and double-strength safety glass. **(358)**

● Placing the convenience of immediate arc welding repair in every maintenance area is the purpose of the new design 180-amp. welder announced by The Lincoln Electric Company, Cleveland, Ohio. The cost of the new welder reportedly makes it practical to do on-the-spot welding and eliminate the wasted travel and waiting time of outside repair.

The dial-type control of the new Lincoln 180-amp. arc welder provides positive setting of the welder output over a wide amperage range. Electrodes from the smallest to 3/16-in. size can be used to weld materials from 20-gauge to ½-in. or thicker plate. The new welder has unusually stable arc characteristics and will weld mild steel, low alloy steel, and 18-8 type stainless steel. Operation on 220-volt single-phase power supply, combined with compact, lightweight construction, permits easy movement of the welder.

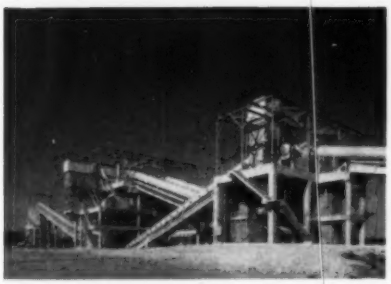
A voltage input adjustment ensures full output performance under all power supply conditions. Permanent cable connections permit safe, trouble-free operation, and construction is weatherproofed. **(359)**



● Designed for one-man operation, the Model C42 Crawler Rotadrill made by Schramm, Incorporated, West Chester, Pa., offers drilling equipment, air compressor, and drill steel capacity for 60-ft. deep holes on single self-propelled crawler. **(360)**

Limestone rides 5½ mile beltline

This cross-country belt conveyor system moves raw materials for Ideal Cement Co.



After being crushed, limestone is screened on Link-Belt vibrating screens and then fed to the 5½ mile belt conveyor system, consisting of seven flights—the longest being 2¼ miles. In its cross-country course the belt conveyor system crosses two highways and two railroads. Cattle and farm machinery can cross at six points.

After thorough studies Ideal Cement Company decided this belt conveyor was the best method for delivering raw materials to their new 3 million barrel plant at Ada, Okla. It can transport 1,000 tons-per-hour of limestone and shale all the way from the quarry at Lawrence, Okla. to the plant.

Design, fabrication and construction were under the direct supervision of Ideal's engineering department. As prime contractor, Link-Belt was responsible for the complete conveyor requirements, including site clearing and excavation, concrete work, access road and fencing, lighting, controls and communications, erection and test running.

For full details call your nearest Link-Belt office, or write LINK-BELT COMPANY, Dept. AV, Prudential Plaza, Chicago 1, Ill.

10,314

LINK-BELT

BASIC PRODUCTS AND ENGINEERING FOR INDUSTRY'S BASIC WORK

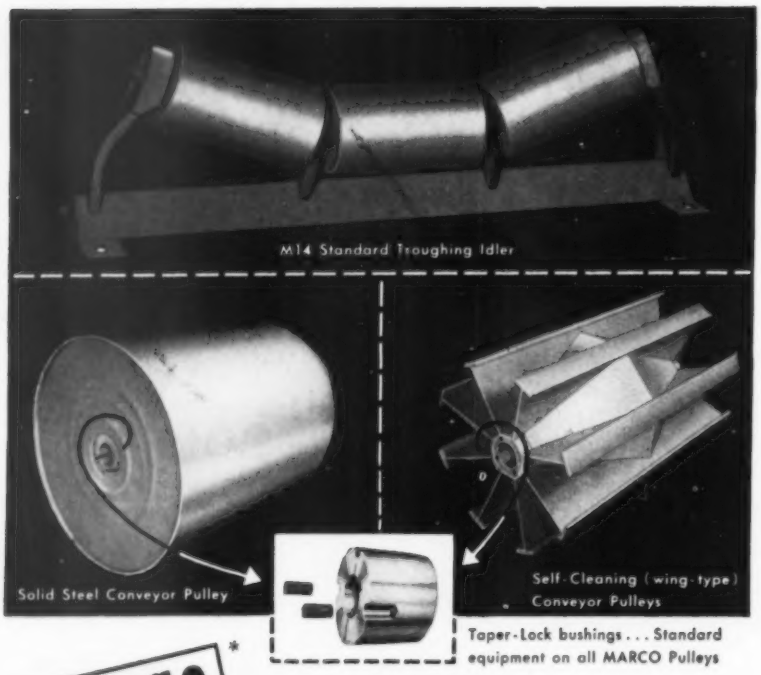
BEARINGS

CHAINS AND SPROCKETS

CONVEYING EQUIPMENT

POWER TRANSMISSION MACHINERY

ENGINEERED (PROCESSING) EQUIPMENT



Taper-Lock bushings . . . Standard equipment on all MARCO Pulleys

MARCO*

The Complete Line of Modern Conveyor Accessories . . .

Engineered to Reduce Your Material Handling Costs

Belt Conveyor Idlers — You'll find MARCO engineering makes a big difference in idlers. MARCO idlers are equipped with precision ground, ball bearings. These bearings are designed specifically for conveyor idlers and at 300 revolutions per minute they will carry loads up to 860 lbs. per bearing. The result,— longer service life and lower power requirements.

Each bearing is pre-lubricated and effectively sealed to eliminate field lubrication and reduce maintenance.

The frame is stronger because of its all steel construction. Material build up is kept at a minimum due to the self-shedding base.

Idlers fit any conveyor frame and are available in many types and sizes. *Ask for Bulletin ID-2.*

MARCO Solid Steel Pulleys — Advantages of MARCO pulleys include: machined faces and Taper-Lock bushings, at a competitive price. Both the belt and pulley last longer because the entire pulley face is machined to insure concentricity with the bore. The Taper-Lock bushings provide the quickest, easiest way to mount or demount pulleys.

Self-Cleaning (wing-type) Pulleys — These self-cleaning pulleys pay for themselves many times in longer belt life when installed in elevator boot sections, conveyor tail sections and gravity take up assemblies. These pulleys are of *all steel*, jig-welded construction and also combine the advantages of machined faces and Taper-Lock bushings.

Whenever you need conveyor accessories — turn first to MARCO.

MARCO idlers and both solid steel and self-cleaning pulleys are available in a wide range of sizes for prompt delivery to meet *your* requirements.

You can save time, trouble and dollars because . . . MARCO specializes in designing and manufacturing conveyors and accessories. Get the facts from your MARCO Distributor or write E. F. Marsh Engineering Co., St. Louis 10, Mo.

MARCO*

Engineered MARCO* Products:

Tubular Frame Belt Conveyors • Conveyor Idlers
Solid Steel and Self-Cleaning Steel Pulleys • Bucket Elevators
Control Gates • Feeders • Bins

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● A "do-it-yourself" self-curing repair kit introduced by United States Rubber Co. permits industrial users to make permanent repairs to conveyor belting and other rubber products without special equipment, highly skilled personnel, or the heat sources usually required.

The "U. S. Holdtite Belt Repair Kit" consists of rubber and fabric-reinforced patches, sheet material, putties, and cements, tools required for most repair jobs, and an instruction manual.

"Holdtite" sealing and patching materials are self-vulcanizing compounds that cure quickly to a tough, resilient rubber at room temperatures. According to the manufacturer, materials offered in the kits (or separately) have high tensile strength and elongation characteristics and are resistant to abrasion, butts, tears, and gouges. **(361)**

● A new, lightweight, disposable pallet, for use in industries that palletize filled bags for truck shipments, has been designed and tested by Union Bag-Camp Paper Corporation, New York, N.Y.

The pallet consists of a sheet of double-wall corrugated board to which are attached two half-cores made of laminated kraft paperboard. These cores can be centered to fit any type of fork-lift truck. As illustrated, the complete pallet can be set up by two men at the user's plant in less than one minute. During the test shipments the pallets were loaded with from 18 to 36 filled bags. The recommended maximum capacity of the pallet is 36 bags. **(362)**

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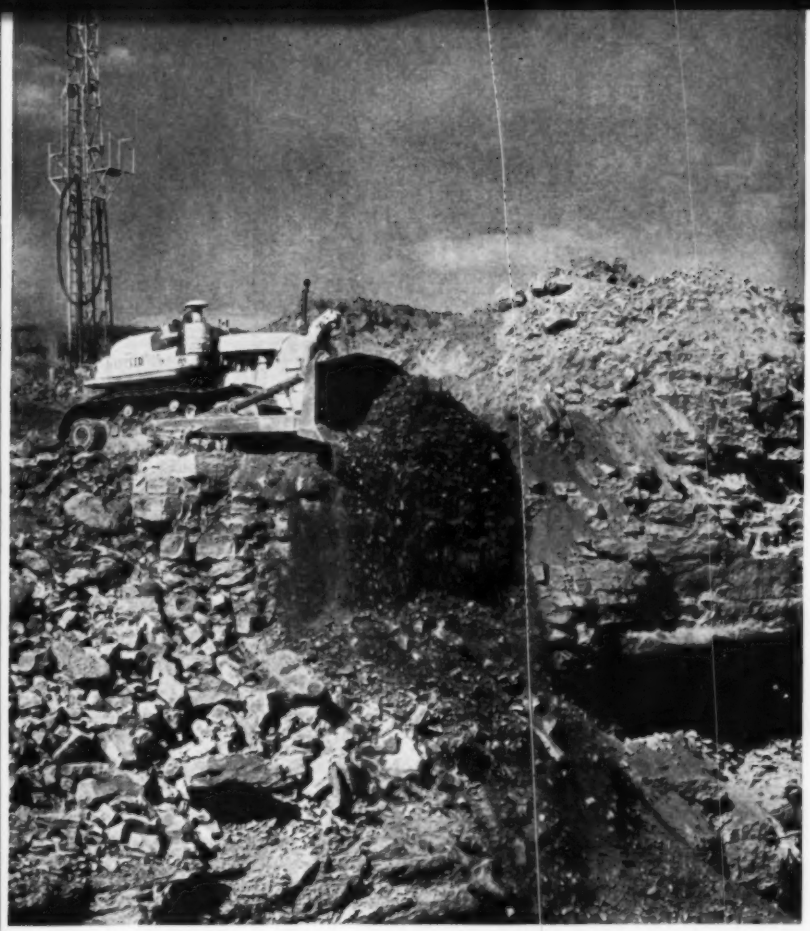


"CLASH-BOX" robbing your CASH-BOX?

Crawlers without full-power shift are obsolete . . . and costly!

If your crawlers have master clutches and manual shift transmissions—"clash-boxes" as they're commonly called—you may be passing up profits that should be yours.

With proven Torqmatic Drive in the Model C-6 and the TC-12, Euclid Crawlers provide full-power shift and instant reverse. There's no loss of power or momentum when changing from one speed range to another . . . no delay for clutching and shifting . . . and with a flick of the wrist you change travel direction fast. It's a dependable power train, too . . . proved in thousands of "Euc" earthmovers on every kind of job.

Have your dealer show you how Euclid Crawlers have more productive capacity on any tractor work . . . dozing, ripping, push loading big scrapers, or towing heavy loads. The seconds they save on every work cycle can add up to more cash in your cash box!

EUCLID Division of General Motors, Cleveland 17, Ohio
Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland.

Proven Torqmatic Drive provides smooth steady flow of power . . . full-power shift . . . instant reverse . . . easy operation. For push loading scrapers the fast maneuverability of "Euc" crawlers cuts scraper cycle time and steps up production . . . changes from one speed range to another, and from forward to reverse and back again, are made under full power . . . there's no clutching.

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

BELT INSTALLATION MEN LIKE TO WORK WITH...

FLEXCO® BELT FASTENERS

Lowell Lynde, Service Engr., Barber-Greene Co. completing the installation of a FLEXCO splice.

Cutaway of a FLEXCO application showing the compression plates, teeth and precision-made bolts and nuts.

He says, "I've spliced most of the belts our Chicago office has sold throughout Illinois and northern Indiana. FLEXCO fasteners have been used on all of them without any trouble. They are easy to install and hold up well regardless of the material conveyed."

PROTECT YOUR INVESTMENT IN CONVEYOR BELTS WITH FLEXCO . . . the quality fastener for all heavy-duty conveyor belt applications: COAL & METALS, SAND & GRAVEL, CRUSHED ROCK, CONSTRUCTION EQUIPMENT, etc.

FLEXCO "25-PAK"

"25-PAK" contains enough fasteners to join common belt widths.

Available in Steel, Monel, Stainless, Everdur. Also Promal top plates.

ORDER FROM YOUR DISTRIBUTOR, OR WRITE TO US FOR BULLETIN F-112.

"FOR THE SPLICE OF A LIFETIME"

Flexible STEEL LACING COMPANY

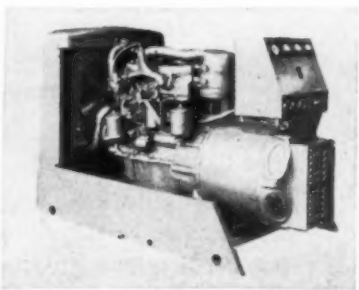
4623 LEXINGTON STREET • CHICAGO 44, ILLINOIS

Enter 66 on card, page 169

• A new boom pendant fitting for wire rope, made of steel and drop forged in one piece, has been developed by Sherman & Reilly, Inc.

The boom pendant fittings are interchangeable with standard wire rope sockets, and have no weldments or castings. (363)

• A new 25,000-watt diesel electric generating plant (Series DZC) is announced by D. W. Onan & Sons, Inc. With a water-cooled Hercules DD226 diesel engine, Onan "Magneciter" generator and Onan controls assembled into one compact unit, this new engine-generator is designed to provide full-rated 25 kw. for both primary and emergency standby applications. (364)



ATTENTION!

Administrative and Production Executives—see page 166 for information about how to reserve your copy of the *1960 PIT AND QUARRY HANDBOOK*.

one of a series:

HEIL

How to improve dump truck operations

Here's help on how to select the right hoist capacity

You expect a hydraulic hoist to lift and dump the loads you will carry—not once, but many, many times, without overload or component failures. It's simply a device that uses power from the truck engine to raise the body and load a given distance in a given time. Lifting effort is produced by hydraulic pressure from the pump through the hoist cylinder.

First Things First

The amount of work your hoist must do isn't the same for all loads. It takes more work, for example, to dump the same load if the load is heaped forward in the body. It takes less work if the body has a long overhang behind the rear hinge. It takes more work to dump to 55° than it does to 45°.

You Don't Have to Guess

Certain hoist models are often referred to as "10-ton" or "20-ton"—a set number of tons capacity. This rating really doesn't mean much unless it is qualified by specific body length, dumping angle, and rear hinge overhang data.

The chart here will tell you exactly what your Heil hoist will do. Heil, because of its undeniable leadership and experience, has specific data that lets you know ahead of time what you are buying.

DUMP BODY HOIST CHART—BODY & PAYLOAD CAPACITIES

HOIST	BODY LENGTH						
	8′ 0″	9′ 0″	10′ 0″	11′ 0″	12′ 0″	13′ 0″	14′ 0″
ARM HOISTS							
AA	12 Tons	11 Tons	10 Tons				
BA		13½ Tons	12 Tons				
CA		17 Tons	15 Tons	13 Tons			
DA			17 Tons	15 Tons	13½ Tons		
EA			20 Tons	17½ Tons	16 Tons	14 Tons	
FA				24 Tons	21 Tons	19 Tons	17½ Tons
GA					26½ Tons	24 Tons	22 Tons
HA					23 Tons	21 Tons	19 Tons
TELESCOPIC HOISTS							
AT	12 Tons						
BT		11 Tons	10 Tons				
CT		13½ Tons	12 Tons				
DT				21 Tons	19 Tons		
ET					21 Tons	18½ Tons	17 Tons
FT				24½ Tons	22 Tons	20 Tons	
GT					31 Tons	28 Tons	26 Tons
HT						38 Tons	35 Tons

GENERAL NOTES: The above figures are based on the following assumptions:
1. Figures shown are total body and payload capacities.
2. Overhang dimension (hinge to end of body) equal to 12″.
3. Level loading.
4. Approximate 50° dump angle.

Other Things are Important, Too

Of course, lifting capacity isn't the whole story of hoist quality. Workmanship, close-tolerance manufacturing, in-plant testing and research . . . these, too, are part and parcel of a quality-built hoist.

You also want help in making the right selection of hoist designs—arm-type or telescopic. You want to be sure you get what you need in dumping angle, stability in dumping off-level, dumping speed, mounting height, and gross vehicle weight. The way to be sure is to go to an expert—your Heil distributor. See him soon. The Heil Co., Milwaukee 1, Wisconsin.

Part of a fleet of Heil dump trucks hauling gravel sub-base for large airport construction.

SEND FOR FREE BOOK

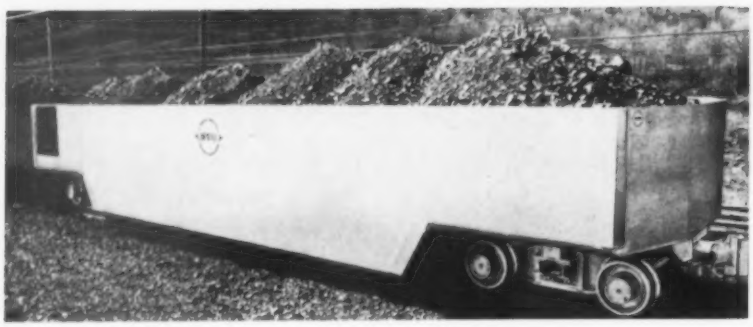
THE HEIL COMPANY
Body and Hoist Division, Milwaukee 1, Wis.:

Send me Heil's new illustrated manual, "How to Select the Right Body and Hoist," as soon as possible. (Check here_____if you'd like a salesman to call.)

*Name*_____

*Address*_____

*City*_____ *State*_____



● The welded aluminum mine car, shown here weighing nearly 50 percent less than conventional cars, was fabricated by Irwin-Sensenich Corporation, Irwin, Pa., from aluminum components supplied by Kaiser Aluminum & Chemical Company, Oakland, Calif. Weight savings of nearly 6,000 lb. per car permit additional load on cars and adding more cars, without increasing normal gross train weight. (365)

● A nickel-silver gas welding rod, Airco No. 21, being marketed by Air Reduction Sales Company, reportedly joins 14 different metals. It can be used to replace many conventional bronze, steel, and cast-iron welding rods in production and maintenance torch applications where the base metal may be heated to 1750 deg. F.

Airco No. 21 rods can be applied in all positions without fuming or overheating the base metals. They are available in 36-in. lengths in 1/16-, 3/32-, ⅛-, 3/16-, and ¼-in. diam. in 10-lb. boxes. (366)

HOW TO SAVE MONEY ON

Gravel Chute • Core Liner
Truck Bottom & Side • Wear Plate

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Do as many time-conscious, money-conscious organizations do

. . . use **ABRASALLOY STEEL**

heat treated alloy plates and sheets

Withstands tremendous impact and abusive crunching abrasion against rock, sand, grit, gravel, other destructive elements. Easily formed, sheared, bent. Amazing hardening qualities. All thicknesses, widths, lengths.

FREE Folder P-1. *Write today!*

ATLANTIC STEEL CORP.

Our 40th Year of Service to Industry

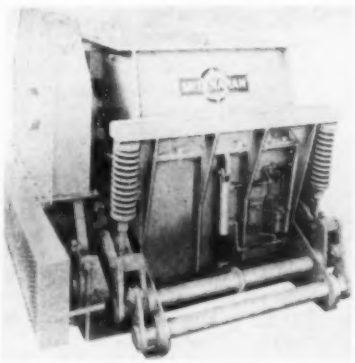
35-27 36 St., Astoria 6, New York

Enter 68 on card, page 169

● A two-stage triple-roll crusher, introduced by McLanahan and Stone Corporation for high-production operations, has three distinguishing features: automatic toggles protect against tramp iron, rolls are gear-driven, and larger sizes are available.

The crusher is composed of a single-roll crushing primary feed against a curved crushing plate; and a double roll below, performing the secondary reduction.

In the standard unit, tramp iron protection is provided by a shear bolt in the center of the torsion bar at the rear. In the new, modified design, completely automatic toggles, attached to the movable secondary crushing roll, allow the roll to move



to the rear to pass uncrushable materials. Then, according to the manufacturer, the toggles immediately return the roll to the desired setting, without stopping the crushing. Design of the toggles reportedly is such that an absolute fixed setting between the rolls is assured at all times, except when tramp iron is being passed. A bulletin describing the crusher is available from the company. (367)

● The new four-wheel drive, four wheel steer NAPCO Crab tractor, manufactured by NAPCO Industries, Inc. features a fiber glass hood and grille with built-in headlights.

In the new model a 6-cylinder gasoline engine offering 72 hp. has been substituted for the 52-hp. engine in the 4-cylinder Crab tractor.

Four-wheel hydraulic power brakes, torque converter, power steering, hydraulic reversing clutch, and heavy-duty NAPCO axles are standard equipment. (368)

Enter 69 on card, page 169 →

NEW!

Fordson's power, weight and economy teamed with Ford's top producing loader and digger

The Fordson Power Major is the newest, most powerful version of the world's first mass-produced tractor . . . traces its origin back to the first Fordson of 1917. During those many years of improvements, Fordson has become a buyword for steady, dependable tractor power and unmatched fuel economy—a gallon an hour or less under full load, according to many owners. Now, for the first time, you can buy a tractor-matched, Fordson-size loader and backhoe. And what a production team it makes!

The loader has 2500 lbs. rated lift capacity, 5500 lbs. breakaway capacity, 22-degree bucket rollback, 3″ below-grade digging and ⅝ to 1 cu. yd. tread width buckets. The same type rugged subframe and hydraulic system mounts and powers Ford 12′ or 14′ backhoes. The largest of these, shown above, is in a class by itself and has no competition except for big, specialized rigs. Why not phone your Ford Tractor and Equipment Dealer right now for detailed specifications?

TRACTORS AND EQUIPMENT FOR 101 INDUSTRIAL JOBS

INDUSTRIAL TRACTOR AND EQUIPMENT DEPARTMENT, FORD MOTOR COMPANY, BIRMINGHAM, MICHIGAN

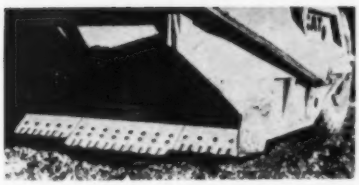
NEW!

Now, a loader and backhoe worthy of the Fordson Power Major Diesel

We'll match the performance, price, productivity, fuel economy, ease of servicing and overall dependability of this new Fordson Power Major package against any similar tractor-loader-backhoe on today's industrial market.

Granted, there's little gamble in this challenge. Fordson diesels long ago won their vote of confidence from tractor users all over the world. The new Ford 2500 lb. Super-Duty loader and Ford 14′ backhoe are basically the same heavy duty units engineered for the Ford Industrial tractor — equipment which has been proved while handling some of the toughest industrial jobs to be found anywhere. Phone your Ford Tractor and Equipment Dealer for a demonstration!

Ford Motor Company



● Field tests, comparing the performance of a scraper using a twisted-tooth blade with that of a scraper using a standard straight-edge blade, were held recently at the Texas A & M Heavy Equipment Operators School, Engineering Extension Service, under the supervision of R. L. Peurifoy.

A Cat DW 15 Scraper, push-loaded by an International TD-20, was operated for two 40-cycle tests. In the first series a straight-edge scraper blade was used; in the second, this blade was replaced by a twisted-tooth blade.

The twisted-tooth blade is a patented design of Shunk Manufacturing Company, Bucyrus, Ohio, and is marketed under the brand name 'Gator Twistooth.

Mr. Peurifoy reports that the load travel distance averaged 161 ft. with the twisted tooth, and 225 ft. with the straight edge. Further, the twisted-tooth blade load contained 9.02 cu. yd. of earth by bank measure—1.02 yd. more than the straight-edge load. By average calculations, an extra yard to every load would increase production by 90 yd. a day, or $36 to $45. (368)

● Two factors, the crown of a roadbed and the concentrated weight of the machine, cause accelerated wear on the center of a grader blade.

The 3-piece grader blade arrangement with heavier hardened blade in the center, developed by Paper, Calmenson and Company, reportedly prevents excessive crown.

The new Pacal X-Tra Edge hardened blade is designed to be self-sharpening. Special sizes of the center blades include ½-in. to ¾-in. x 8-in. center section and ⅝-in. to ⅞-in. x 8-in. hardened center section.

The manufacturer claims that the increased thickness increases strength, and that as much as 70 percent in blade replacements and downtime can be saved. (369)

PROFITABLE TONNAGES

of cleaner, drier product

Greatly improved drive with direct shaft mounted reducers . . . more effective performance in a broad range of operating conditions . . . heavier construction for longer service—these fundamentals make McLanahan Single or Double Screw washers your soundest buy.

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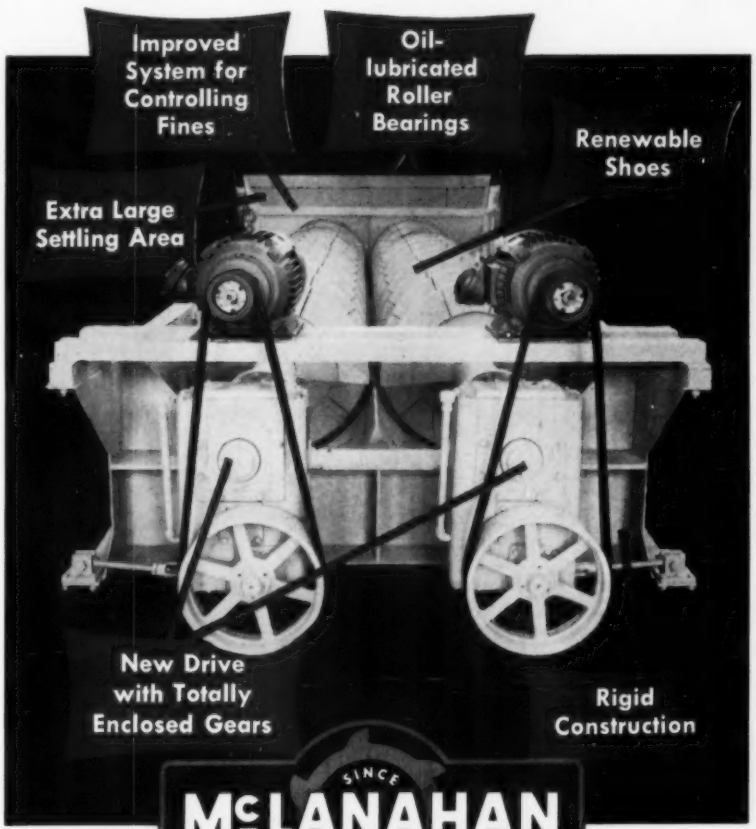

SCREW WASHERS

McLANAHAN & STONE CORPORATION

253 Wall Street Hollidaysburg, Pennsylvania

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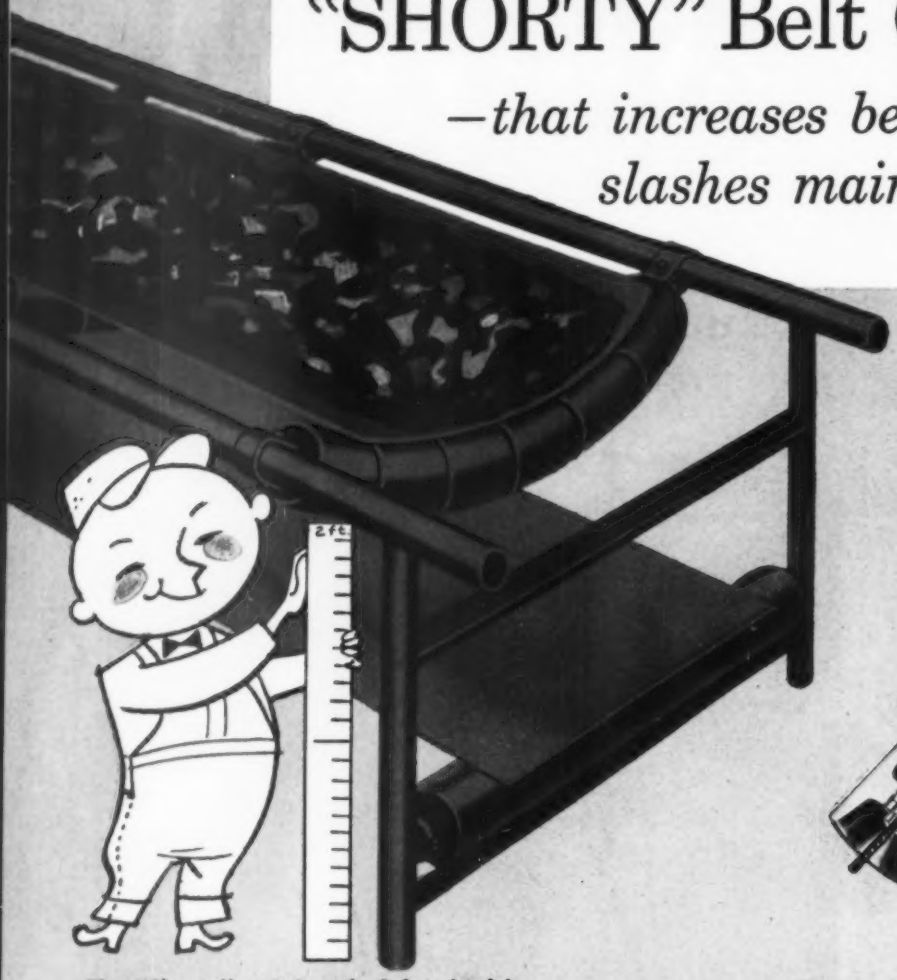
See the NEW McNally Pittsburg

"SHORTY" Belt Conveyor

—that increases belt life, slashes maintenance cost!



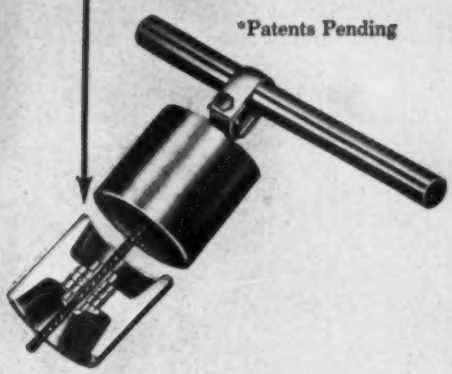
The "Shorty" unit is only 2 feet high!

The new "Shorty" underground conveyor featuring the new McNally Pittsburg Cradle Idler is ideally suited for use in limited working areas. Vertical supports are only 2 feet high. For extremely low clearance installations these conveyors can be made with 3" diameter rollers (instead of the standard 5"), and the average over-all height can be as little as 17" for a 36" belt, using a 30° deep trough idler construction.

For "Do-it-yourself" construction, the H-frames and stringers (which may be either wire rope or pipe stringers) are shipped disassembled and may be assembled in the field to fit any conveyor length necessary. It is only necessary to cut the stringers to the desired length, attach the Cradle Idlers and H-frames, and your conveyors are ready for operation.

Exclusive NEW Patented Cradle Idler*

*Patents Pending



The secret of the dramatically improved performance and lower maintenance cost of this new heavy duty conveyor is the *true catenary suspension* of the Cradle Idlers. Since the rollers *rotate* on the steel rope, dangerous "loping and harmonics" cannot develop. The 5" rubber rollers, assembled on precision ground ball bearings, are prelubricated, lifetime sealed.

- Increased belt life—because full belt support is maintained under all conditions
- No creasing or cutting of belt
- Minimum maintenance

McNally Pittsburg Mfg. Corp., Pittsburg, Kansas

☐ Please send information on the new McNally Pittsburg belt conveyor.

☐ Have Sales Engineer call for further consultation.

Name_____ Title_____

Company_____

City_____ State_____

P

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
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FIGHT OFF CUT-IMPACT DAMAGE

with the New Nylon U. S. Royal Super Con-Trak-Tor S. R. T.*

STEEL-REINFORCED TREAD

Steel-Reinforced Tread*, with its thousands of steel filaments (that can't rust out), forms a virtually impenetrable mat between tread and body, provides exclusive new protection against cut-and-impact failures. Deeper tread at center and shoulders, *plus* Double-Strength Nylon, *plus* triple beads in 14.00 or over cross section, make the U. S. Royal Super Con-Trak-Tor* the world's toughest off-road tire, outperforming competitors by up to 95%. Don't settle for less on *your* jobs!

U.S. ROYAL SAFETY 1ST TRUCK TIRES

United States Rubber

Rockefeller Center, New York 20, N.Y.

Labor Developments

(*Continued from page 13*)

executed a bargaining contract with the union.

After a change in ownership of the business, the union's request, made to the new owner for recognition and a contract was denied. Beginning in October, 1958, and continuing thereafter, the union picketed the establishment with signs displaying the words "On Strike" and "On Strike for Renewal of Our Union contract." Throughout this period the picketing union made no effort to induce employees of any other employer to refuse to pick up, deliver, or transport goods, or perform their regular services.

After the passage of the new law, the union continued its picketing activity without change. The employer went into court for the purpose of obtaining an injunction. The court refused to issue one. In explaining its decision, the court stated: "Although an object of picketing may be bargaining, and it admittedly is in this case, it is immunized from the statute if the purpose of such picketing is also truthfully to inform the public that the employer does not have a contract with the union and further if the picketing does not curtail picking up, delivery, or transportation of goods or the performance of services.

"It is difficult, if not impossible to imagine any kind of informational picketing pertaining to an employer's failure or refusal to employ union members or to have a collective bargaining agreement where another object of such picketing would not be ultimate union recognition or bargaining. In most instances, certainly, the aim of such informational picketing could only be to bring economic pressure upon the employer to recognize and bargain with the labor organization."

If this ruling were to stand up as the ultimate interpretation of the intention of Congress, it is difficult to see how any organizational picketing could be barred, provided that it also had some informational aspect.

In New York, on the other hand, a union which tried to conform with the law's new requirement nevertheless lost its case before the federal court. Here, the union notified the employer that it had withdrawn its demand for recognition but that it was continuing to picket only to inform the public that the employer was not union and did not conduct his business in accordance with union standards. The picket signs stated only that the employer had discharged employees because they had joined the union, that the employer did not have a contract with the union, and that the employees of the company did not enjoy union wages, hours, and working conditions.

In this case, as well, there was some interesting history. Picketing for recognition had been conducted over a three-year period, but after enactment of the 1959 Amendment to the National Labor Relations Act, the union notified the employer and the National Labor Relations Board that the objectives of its picketing had changed.

In explaining its position, the New York court appeared to follow quite contrary reasoning to that employed by the Indiana court. It said, "Even though the immediate objective of the picketing may be to divert business to union restaurants, it is obvious that this is merely a step to the ultimate objective, which is to force the Stork Club to bargain with the union as representatives of its employees. The immediate objective may be to divert business from the Stork Club; the ultimate objective, obviously, is to put the union in a position to act as bargaining agents for the employees and to force the Stork Club to recognize this condition."

It is perfectly clear now that there is sufficient diversity among the judicial rulings so that a higher court will have to straighten out the matter. It should also be pointed out that each of the cases coming up at the moment have long histories which frequently color the final decision. Nevertheless, the fact remains that, for the first time, employers have a fairly reliable avenue through which to obtain relief from a most harassing and destructive tactic, the eternal picket line.

TRIAL SAMPLES

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HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal—no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300%—special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
- Wire Rope and Cable
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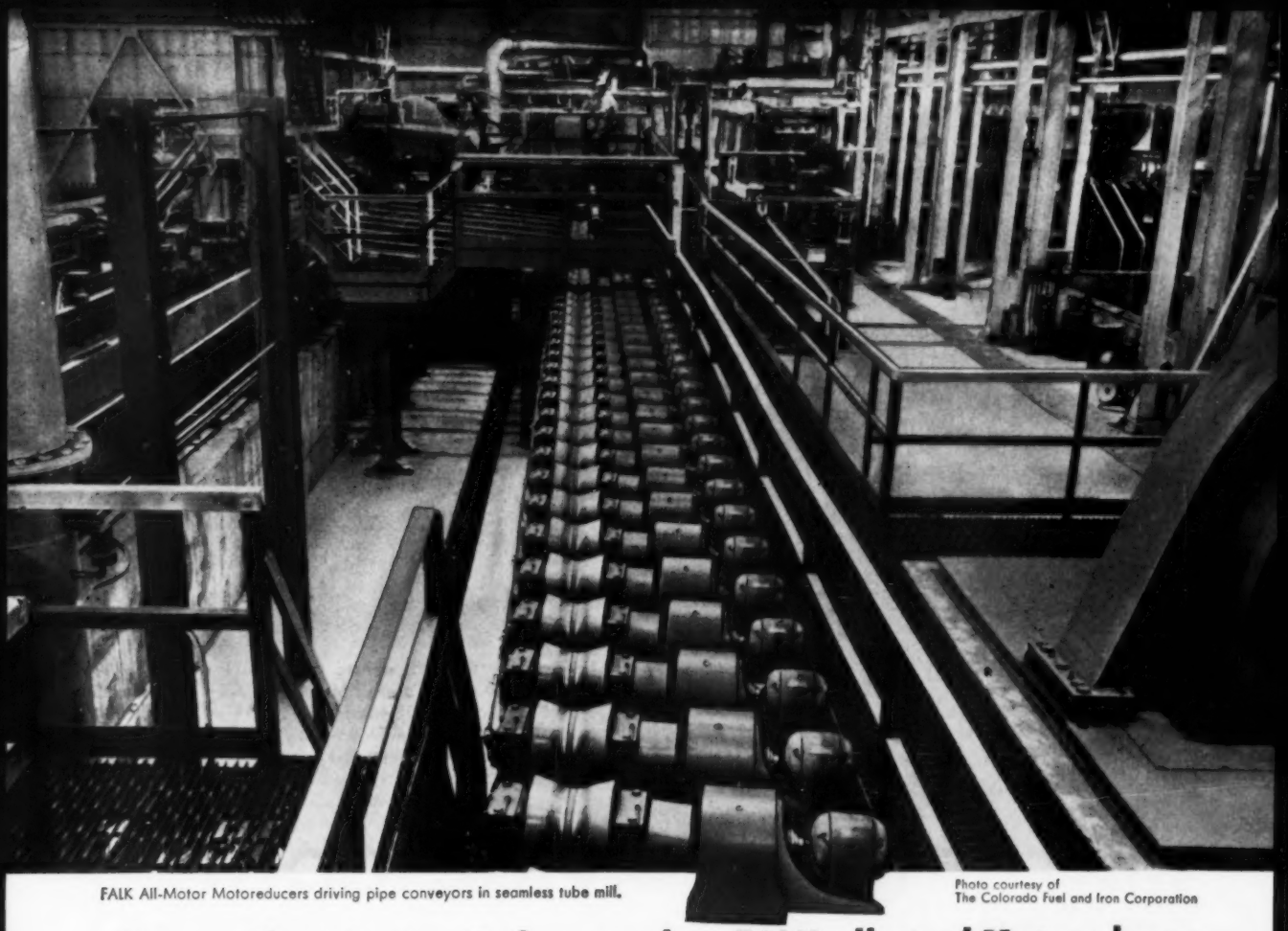

FALK All-Motor Motoreducers driving pipe conveyors in seamless tube mill.

Photo courtesy of
The Colorado Fuel and Iron Corporation

You get these "extras" when you buy FALK *all-steel* Motoreducers

1. **Freedom from damaged housings.** The exclusive FALK *all-steel* construction gives full protection from cracked housings or torn-off feet...plus twice the ability of cast iron to maintain vital alignment.

2. **Inherently stronger gear teeth.** By AGMA standards, Falk extra-depth, high pressure angle helical gears are inherently stronger than ordinary helical teeth, thus assuring reliable operation and longer gear life.

3. **Highest known gear efficiency**—98½% per gear mesh under full load! This means maximum productive work for your power dollar.

4. **Longer service life**...advanced FALK design makes it possible to machine both bores for each shaft assembly at one time, thus eliminating possible accumulation of tolerances that occurs when individually machined parts are assembled. The result—better alignment of revolving elements that permits units to transmit rated capacity longer.

5. **Standard units to fit your needs.** Integral and All-Motor® Motoreducers are available in horizontal, vertical and right angle types...a type for every use.

Units are available up to 75 hp; output speeds from 780 rpm down to 1.2 rpm. Prompt delivery from factory, warehouse or distributor stocks. Ask your FALK Representative or Authorized FALK Distributor for *Bulletin 3100.*

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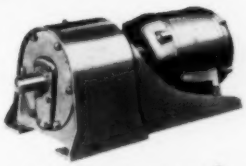
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in most principal cities

FALK

...a good name in industry



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the original All-Motor unit

(Shown) Horizontal concentric model. Also available in right angle and vertical types.

THE ALL-STEEL FALK® SHAFT MOUNTED DRIVE

Proved best for the countless industrial applications where a reducing unit mounting directly on shaft of the driven machine is indicated.

Units from 1/2 to 50 hp. Ratios —4:1, 14:1 or 24:1. Torque capacity up to 41,000 lb-in (in standard units). Prompt shipment from stock. For details, ask for *Bulletin 7100.*

8 PAYLOADER® H-120's SPEED LOADING FOR MATERIAL SERVICE CORP.

Long reach (3½ ft. ahead of wheels) and high lift (14½ ft. under bucket hinge pin) builds higher stockpiles, can heap-load big trucks easier for in-yard handling and can level-off the top of loads in big trucks to prevent spillage on highways.

Work 16-hour shifts loading and stockpiling

Material Service Corporation is one of the top ten among the nation's aggregate producers and is still expanding. A big reason for the success of this materials supplier is because "Service" is more than just a middle name — it's the keystone of their philosophy.

Another "good habit" throughout the organization is the constant study of new and more efficient machinery and methods that can be successfully used in its many plants. As a part of this continuous improvement program, eight of the new Hough model H-120 "PAYLOADER" tractor-shovels have been purchased and put to work at their many sand and gravel plants in Illinois and Indiana since this big machine was introduced in 1959.

A typical work-day for any one of Material Service's H-120's is a continuous 16-hour shift from 5 AM to 9 PM: truck-loading from 8 AM to 4:30 PM; stockpile-building, trimming and clean-up during the other 7½ hours.

One of these big machines can go from one end of a big yard to the other in a matter of seconds to do a job. It operates as easily and cycles as fast as smaller loaders, yet easily handles 6-tons per pass. It enables you to give customers that quick, no-wait truck-loading service that is so important today. Its controlled dumping and its exceptionally long reach and high lift can load small trucks gently or large trucks fully.

Chances are it will pay you to use big, fast Model H-120's or smaller "PAYLOADER" tractor-shovels too. Your nearby Hough Distributor offers you the widest range of sizes and models, and the most complete service-parts facilities, backed by factory service personnel, to make your "PAYLOADER" investment pay.

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.

An H-120 "PAYLOADER" fills its bucket with sand or gravel easily and quickly because of powerful traction and tremendous break-out force. Bucket tips back 40° at ground.

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☐ Send data on Model H-120 "PAYLOADER"
☐ Send data on smaller "PAYLOADER" sizes

Name _____

Title _____

Company _____

Street _____

City _____ State _____

4-B-4

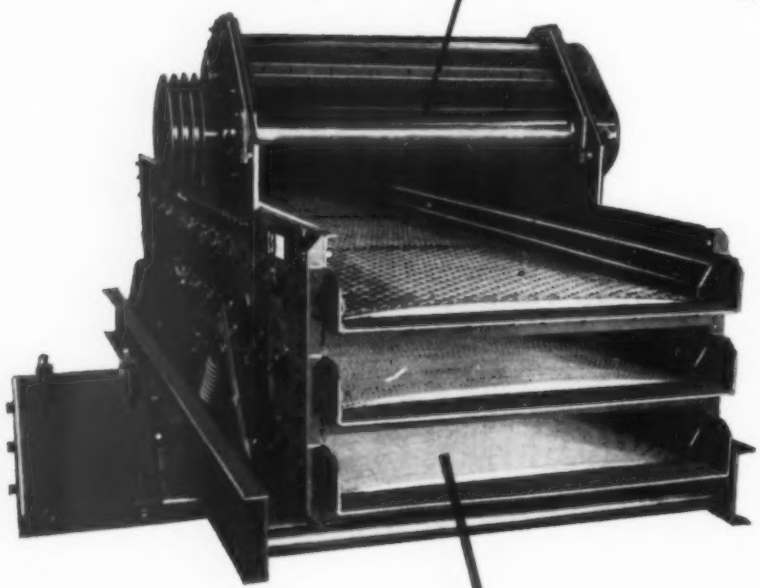
NEW SIMPLICITY HORIZONTAL VIBRATING SCREEN

• CONVEYS AND SCREENS material in mining and gravel plants where minimum headroom is a problem

Simplicity Engineering Company has built a new horizontal vibrating screen, Model OA-95, designed to operate in mining and crushed stone plants where headroom is the governing factor. In this type of operation, it is necessary to both convey the oversize material and screen the undersize material. To do these two jobs successfully, the rugged shaft assemblies have two full length, cast alloy off-set shafts. These counter-rotating shafts, geared together, with heavy duty precision bearings that run in oil, provide the extra power needed to operate large screen areas on an efficient basis.

The Model OA-95 is equipped with a straight line deck designed to withstand the punishment of severe impact and loading stresses. The one-piece deck has all-welded construction and is stress relieved in an electric furnace to insure greatest strength and durability.

Available in sizes from 4′ x 10′ to 4′ x 16′, the new, 3-deck screen can be quickly converted to a two-deck unit by removing the center deck.



For complete information on the OA-95 Horizontal Vibrating Gravel Screen and other screening equipment, scalpers, feeders and feeder grizzlies manufactured for the gravel and mining industries, write to Simplicity Engineering Company.

Simplicity
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ENGINEERING COMPANY • DURAND 12, MICHIGAN

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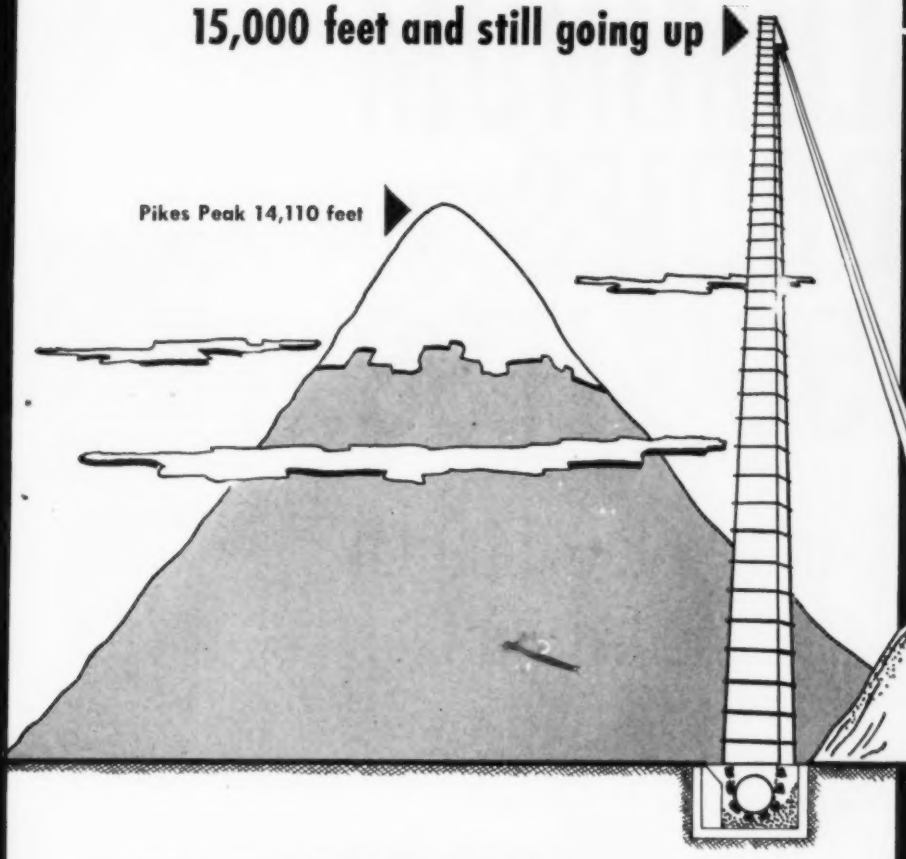
Another PLUS value...

15,000 feet and still going up



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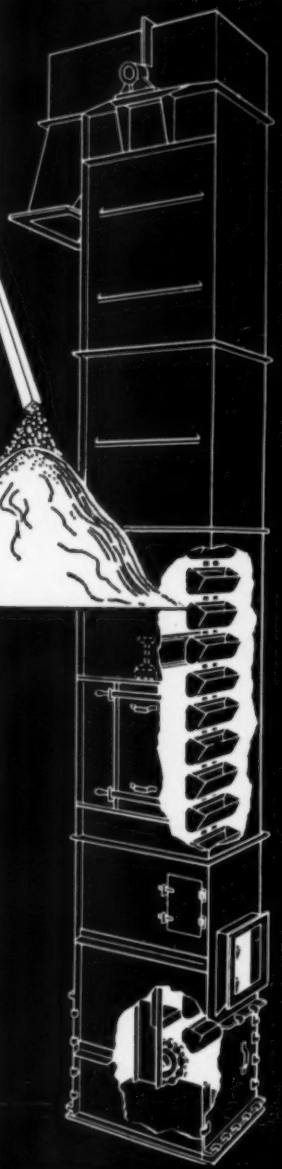

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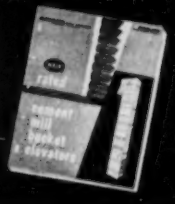

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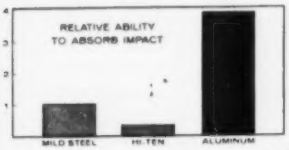

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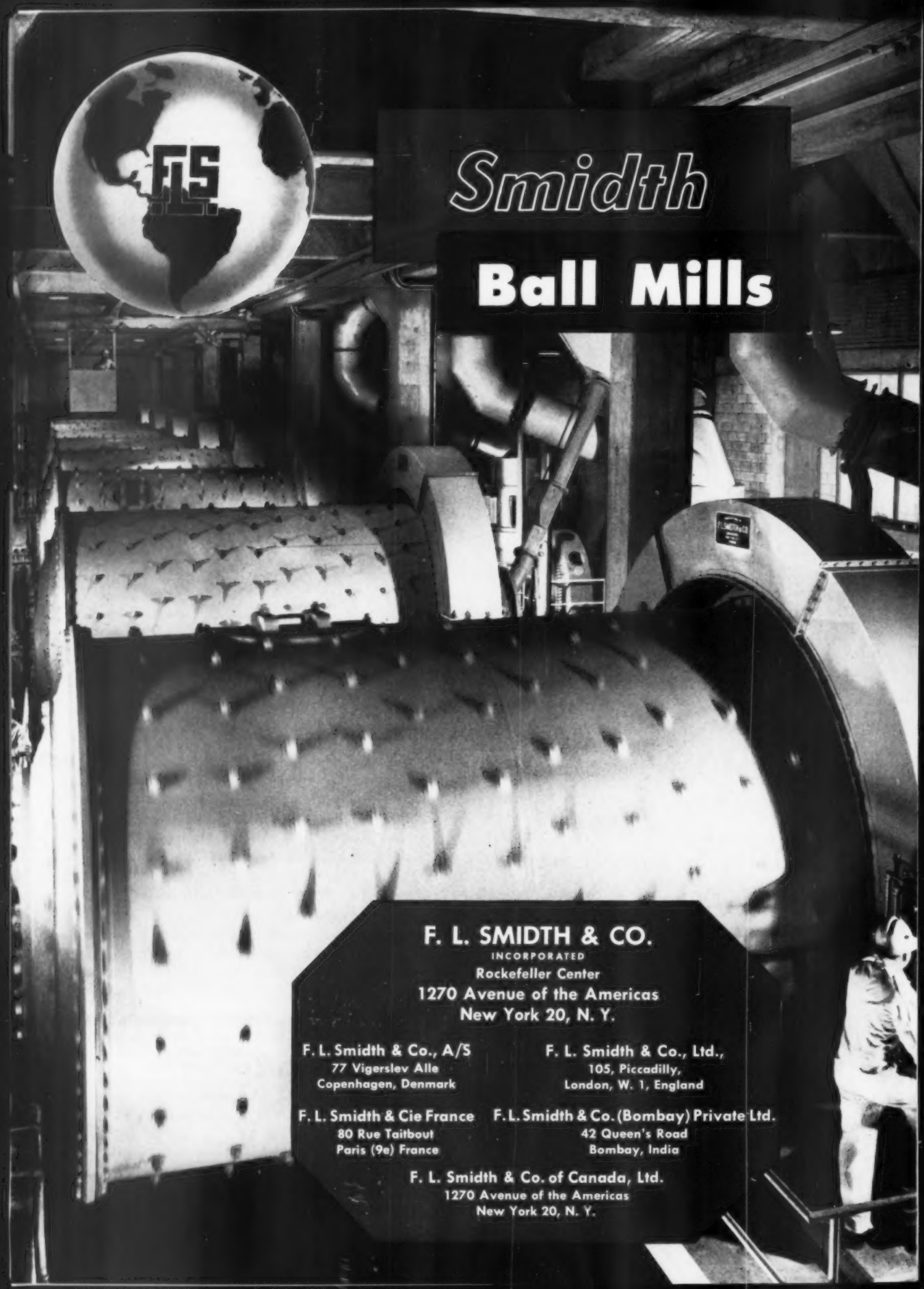

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The Editor's Page

These are Answers to Your Problems

EVERY year the major nonmetallic minerals industry associations hold their annual conventions, and we report them in these pages for the many who are not able to attend them. In this April issue we report the conventions of the National Sand and Gravel Association and the National Crushed Stone Association. In March we reported the convention of the National Limestone Institute. At each of these, many subjects of vital importance were discussed and many new developments were described.

Nowhere else than at these conventions can a producer of sand and gravel, crushed stone, or agricultural limestone get so much information of such great value on so many important subjects. This information we are, as usual, passing on to our readers to the best of our ability. Membership in these associations and attendance at their conventions result in additional important but less tangible benefits.

ONE OF the major problems in arranging a convention program such as these is not to get enough material or speakers, but to select the best and most important subjects and speakers for the limited amount of time available. We have a similar problem in reporting these conventions for our readers. There is very little that is irrelevant or unimportant on these programs and, therefore, little that we can conscientiously eliminate. We hold firmly to our conviction that anything worth reporting should be described in enough detail to be of direct value to the reader. This conviction is constantly being bolstered by requests from producers that we continue to give them complete, factual reports, not only on the important conventions, but also on other developments of interest to them.

We also believe we should make it easy for the reader to find what he wants to read. At these conventions the producer can attend the meetings which cover the subjects in which he is interested, and he can pass up the others. The reader can do the same in looking over our reports, and this year we have made it much easier for him to do so. In these reports of the N.S.G.A. and N.C.S.A. conventions we present first a full coverage of the routine association affairs which are of interest primarily to the association members. Second, in a separate following article we present full reports of the many important papers, panel discussions, etc., which are of interest to every producer. These reports are grouped by general type of subject, and each subject in a group is clearly identified and easily found.

THESE conventions are not just association meetings; they are industry conventions. The subjects discussed are industry problems, including business prospects, the road program, public relations, labor laws, zoning, percentage depletion, depreciation, legal and tax matters, technical and operating matters, merchandising, accounting, safety, traffic, group insurance, pensions, etc. These reports represent to a large extent the important work these associations are constantly doing for their industries. In order to further insure that all industry members can profit from these conventions, the associations invite the industry trade press to report them in detail for those who were not there. We would be remiss in our obligations to our readers if we did not pass on this important information to the best of our ability.

Walter E. Trauffer

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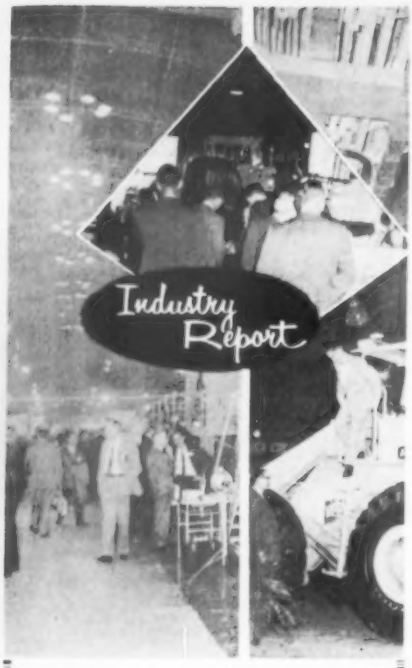


44th ANNUAL

*PART I:

Program plus biennial show draws over 7,000 registrants

*

PART I *of our report, starting here, covers general association business, and broad subjects of industry-wide interest . . . the balance of the report is in*

PART II . . . *starting on page 90 . . . in which discussions of specific industry problems are considered in detail . . .*

ANOTHER ON THE SPOT REPORT

GENERALLY regarded as the most successful annual meeting in the history of the National Sand and Gravel Association, the 44th convention of this group was held February 15 to 19 at the Conrad Hilton Hotel in Chicago, in conjunction with the 30th annual convention of the National Ready Mixed Concrete Association.

The combination of a comprehensive program, which through prior distribution stimulated widespread interest, and the opportunity of visiting what turned out to be the most outstanding combined biennial equipment show for these industries, was an effective lodestone for a record registration of about 7,200.

Preceding the three-day schedule of general sessions, there were meetings of virtually all association committees and of the boards of directors of the two groups.

Our readers will find in this reporting of these conventions a departure from former practice. The material presented below relates primarily to association business and procedures, and also contains information on subjects of a generally broad scope. Immediately following this article is one in which the wide range of specific topics covered in the sessions has been categorized to management, operating, engineering, etc., and reported in appropriate detail.

Without question, all sections of

The leadership of retiring N.S.G.A. President E. Phil Gemmer, right (Texas Construction Material Company, Houston, Tex.), is recognized with a commemorative plaque presented on behalf of the membership by past-president (1956-57) R. E. Weaver (The Lincoln Sand & Gravel Company, Inc., Lincoln, Ill.).

With Mr. Gemmer, left, are the new top officers of N.S.G.A.—Vice-president Fred P. Curtis (Lyman-Richey Sand & Gravel Corp., Omaha, Nebr.), President E. K. Davison (J. K. Davison & Bros., Pittsburgh, Pa.), and Secretary-treasurer Harold E. Bender (Azusa Rock & Sand Company, Azusa, Calif.).

N.S.G.A. CONVENTION BREAKS RECORD

By THE EDITORS
Of PIT and QUARRY

the program—whether general in nature, or slanted at specifics—were developed with the interests of all producers in mind.

President's Address In a characteristically modest final address, President E. Phil Gemmer (Texas Construction Material Co., Houston, Tex.) reviewed the accomplishments of the association and developments in the industry during his tenure of office. The outstanding work done by the N.S.G.A. staff was cited by Mr. Gemmer, who said that his company regards the association as its research department, with equipment and a staff far beyond any company's range on an independent level. In closing, he predicted another record year for the entire sand-and-gravel industry.

Appreciation on the part of association members for Mr. Gemmer's leadership and effort expended on their behalf during his two-year presidency, was expressed by R. E. Weaver (president, 1956-57), who presented Mr. Gemmer with a plaque from the membership, commemorating his service.

Elections The new officers of N.S.G.A. are as follows: president, Edward K. Davison (J. K. Davison & Bro., Pittsburgh, Pa.); vice-president, Fred P. Curtis (Lyman-Richey Sand and Gravel Corp., Omaha, Nebr.); secretary-treasurer, Harold E. Bender (Azusa Rock and Sand Co., Azusa, Calif.). The five members at large elected to the board of directors at the Chicago convention are Charles E. Brady (B. V Hedrick Gravel and Sand Co.); Irving Crown (Material Service Corp.); Henry H. Kirwin (Eastern Rock Products, Inc.); A. H. Smith; and Irving Warner Jr. (Warner Company). Mr. Brady is also the new member of the executive committee.

Coming Meetings The 1961 joint conventions of the National Sand and Gravel Assn. and the National Ready Mixed Concrete Assn. will be held January 23 to 26 at the Hotel Americana, Bal Harbour, Fla. (The convention of the National Crushed Stone Assn. will be held the preceding week.) The 1962 joint conventions and biennial show will be held February 12 to 16

Among those at the head table during the joint luncheon meeting of the N.S.G.A. and N.R.M.C.A. boards of directors were, (l. to r.): W. J. Doyle Jr. (Tulsa, Okla.); R. McKendrick (executive vice-president of C.I.M.A.); Stanton Walker, director of engineering for the associations; William Moore (Boston, Mass.), past-president, N.R.M.C.A.; Vincent Ahearn, executive secretary of the associations; E. Phil Gemmer (Houston, Tex.), N.S.G.A. president; and F. E. Schouweiler (Fort Wayne, Ind.), N.R.M.C.A. president.

at the Conrad Hilton Hotel and the new Chicago Exposition Center. The 1963 joint conventions will be held February 11 to 15 at the Fairmont Hotel, San Francisco, Calif.

The 1960 semi-annual meeting of the boards of directors of both associations will be held October 4, 5, and 6 at the Del Monte Lodge, Pebble Beach, Calif. The 1961 board meetings will be August 14 to 16 at The Greenbrier, White Sulphur Springs, W. Va. In 1962 the boards will meet September 30 to October 3 at The Broadmoor, Colorado Springs, Colo. The boards will meet in 1963, September 30 to October 2 at the Grove Park Inn, Asheville, N. C.

Manufacturers' Division The new chairman of the Manufacturers' Division of N.S.G.A. is Emil Deister Jr. (Deister Machine Co., Fort Wayne, Ind.), who, as vice-chairman, had finished the uncompleted term of W. A. Rundquist. The new vice-chairmen are: Harry F. Lawrence (W. S. Tyler Co., Cleveland, Ohio) and Herbert Knudten (Universal Engineering Co., Cedar Rapids, Iowa). Carrying over as vice-chairmen are: John E. Dunn (Allis Chalmers Mfg. Co., Milwaukee, Wis.) and John F. Steffens (Ludlow-Saylor Wire Cloth Co., St. Louis, Mo.).

New members of the board of directors are: W. F. Marsteller Jr. (Owen Bucket Co., Cleveland, Ohio); Al Bellows (Baldwin-Lima-Hamilton Corp., Lima, Ohio); A. C. Scott (Ford Motor Co., Dearborn, Mich.); D. F. Marsh (E. F. Marsh Engineering Co., St. Louis, Mo.); John Powlison (Simplicity Engineering Co., Durand, Mich.); T. E. Bridgewater (Werco Steel Co., Chicago, Ill.). Representing the Manufacturers' Division on the N.S.G.A. board of directors are Messrs. Deister, Dunn, and J. Craig McLanahan (McLanahan & Stone Corp.; Hollidaysburg, Pa.).

Highway Program Although Bertram D. Tallamy, Federal Highway Administrator, was scheduled to speak on the topic *A Candid Look at the Highway Program*, his paper was presented by Mr. Monahan, his special assistant, because Mr. Tallmay was unavoidably detained in Washington.

During the current fiscal year, federal highway construction will not be as high as it was expected to be according to plans made several years ago, stated Mr. Monahan. The program will continue to move along, but at a reduced pace. This is because the Federal Highway Program is on a pay-as-you-go basis and money must be available in the Highway fund before it can be spent.

Money for the Highway Fund comes from gasoline taxes. President Eisenhower recommended that a tax of 1½ cents per gallon be levied on gasoline for this purpose, but Congress saw fit to make the tax 1 cent per gallon. As a consequence, federal highway construction will be curtailed during the current fiscal year.

As of now, 5,800 miles of federal highway system have already been completed; and action of some sort has been taken on three-quarters of the entire 41,000 miles of the national network of highways. Aggregate costs have represented a "fairly substantial part of the completed highway cost, because of every $1,000,000 spent for completed federal highways, $70,000 is spent for aggregate material."

Despite the seemingly high cost of our modern highways, they already have started to pay dividends. With only 2.8 deaths per every 100,000,000 miles traveled, these roads are today twice as safe as our older highways. At this rate, the new highways are expected to save 4,000 lives each year. This alone is a great national asset that will continue to pay dividends for years to come.

Safety Contest A feature of the annual convention is always the presentation of trophies to the winners of the two safety contests—those for the N.S.G.A. contest being provided by *Rock Products*, and those for the N.R.M.C.A contest by MODERN CONCRETE. The winners for the 1959 N.S.G.A. contest were:

Class A— more than 500,000 tons—Consolidated Rock Products Co., Irwindale Plant, Los Angeles, Calif.

Class B— 200,000 to 500,000 tons—American Aggregates Corp., Indianapolis 15 H (Harding Street) Plant, Greenville, Ohio

Class C— less than 200,000 tons —Stewart Sand and Material Co., Kaw No. 2, Kansas City, Mo.

Certificates of Achievement in Safety were also awarded to the 147 plants, including the above, which had accident-free records during the year. In 1959 a total of 19 plants had completed five consecutive accident-free years.

Awards for the three trophy-winning plants in the safety contest were accepted by Quentin W. Best, Consolidated Rock Products Co., Los Angeles, Calif. (Class A trophy for the Irwindale plant); Neil Garrison, American Aggregates Corporation, Greenville, Ohio (Class B trophy for the Harding Street plant, Indianapolis, Ind.); and George E. Walton, Stewart Sand & Material Co., Kansas City, Mo. (Class C trophy for the Kaw No. 2 plant).

Joint Luncheon Those expecting to hear an outstanding address during the annual joint luncheon of the two associations were far from disappointed. The featured speaker was Senator Carl T. Curtis (R., Nebr.), a member of the McLellan investigating committee. F. E. Schouweiler, president of N.R.M.C.A., presided at the luncheon.

Concentrating primarily on nation-wide labor problems and recent labor legislation, the senator noted also that the responsibility for the nation's welfare in *all* areas—budget, defense, debt, etc.—falls on every citizen and should not be considered problems for the Federal Government alone.

The latter, particularly, should not be expected to take responsibility for the public welfare—including the enforcement of law and order—at the state and local levels. This should be handled by local agencies and organizations which to date, unfortunately, seem to have often shirked that responsibility.

Many significant developments in the labor picture were uncovered in the investigations of the McClellan Committee, most especially, the speaker pointed out, the power of labor unions in manipulating local politics, and their apparent immunity from law enforcement. These are but two of the most important abuses of labor which could be stamped out if local citizenry and their elected officials assumed their proper responsibilities.

On the national level of labor relations, Senator Curtis emphasized that industry-wide bargaining is not in the public good. Using the recent steel strike as an example, he noted that pressure on negotiators from many and varied interests will lead to a settlement for expediency—one that will add to future economic ills.

Labor's true friends in Congress, he said, are the legislators who voted for the bill correcting labor abuses. The recently-passed legislation provides the rank-and-file union member with more protection and a voice in democratic operations of his group. The committee investigations preceding this legislation were not to expose or condemn labor and unions *per se*, but to lay open the rotten core, Senator Curtis declared.

Washington Report Many striking developments were recorded during 1959, and their full effect cannot be measured for a long time, said Vincent P. Ahearn, executive secretary of the association in his annual report on the Washington political scene.

One of the most significant, he indicated, was the fact that Congress—when the chips were down—made it clear to labor unions that the best interests of the country take precedence over union ambitions.

Defiance of union political retaliation threats was exemplified in the enactment of the Griffin-Landrum bill, which served notice that Congress as a whole would not knuckle under to labor union domination.

Generally, and by conservative standards, it was noted, Congress acquitted itself very well last year. While labor union reform was possibly the most dramatic and critical issue, financing the Federal-Aid Highway System through an increase in the gasoline tax was another major area of legislation.

However, many serious domestic problems were not dealt with, and since 1960 is an election year, these will undoubtedly be avoided in the present session. They include the agricultural surplus, federal aid to schools, civil rights, and defense.

Concerning the Presidency, Mr. Ahearn emphasized that this is just too big a job for one man, and that people must soon come to that realization. The magnitude and number of problems faced by the Chief Executive dictate the delegation of more responsibilities to the Vice-President than now permitted under the Constitution.

One of the most far-reaching problems that the next President will face is the deterioration of state sovereignty—a situation that has developed from the willingness of state and local governments to surrender Constitutional rights and responsibilities in return for federal grants-in-aid. This concentration of power in the Federal Government can only be corrected, the speaker stated, when all the people realize that such will destroy our free society.

The highlight of the associations' joint luncheon was an analytical review of labor union activity by Senator Carl T. Curtis (Nebr.).

A report on the progress of the highway program was presented for its author, Bertram D. Tallamy (Federal Highway Administrator), by his assistant, Robert M. Monahan (U.S. Bureau of Public Roads).

Film Presentation At the Wednesday evening general session the Portland Cement Association presented a series of eight motion pictures which illustrated all phases of concrete production from its manufacture to the end-use in various types of construction.

Mountains to Microns, a general film of interest also to people outside the cement industry, illustrates the manufacture of portland cement. Other films of general interest illustrated the use of concrete on the farm and reviewed some dramatic examples of concrete construction in the United States. Examples shown

A comprehensive review of the Washington scene by the associations' executive secretary, Vincent Ahearn, has long been a popular feature of the annual meetings.

Hal G. Feraud, presiding officer for the conference on operation of state and area associations, cautioned against being "half safe"—full benefit can only be obtained through participation and membership in both national and local organizations.

in the motion pictures illustrated hyperbolic paraboloid roofs, thin-shell construction, and other dramatic uses of concrete.

For the more technically minded there were three movies showing the proper method of manufacturing, placing, and curing of concrete.

These motion pictures are available from the district offices of P.C.A. for showing to associations and other groups.

State, Area Association Conference On the day preceding the opening of the general convention, a session was devoted to reports on operations, objectives, and problems of producer groups at state and local levels.

"Don't be half safe," warned Hal G. Feraud in his introductory remarks as presiding officer of the state and area association conference. Mr. Feraud, executive secretary of the Southern California Rock Products Association and the Southern California Ready Mixed Concrete Association, noted the effectiveness of state or area association efforts within their regions, but pointed out that only membership in *both* the national and the state groups would give full coverage on industry-wide problems.

Co-ordination of National, State Group Activities As a director of N.R.M.C.A. and secretary of the Minnesota state association, Robert C. Shiely (vice-president, J. L. Shiely Company, St. Paul, Minn.) has recognized the need for co-ordination of state and area, and national association efforts.

Area groups are increasing in both number and services, it was noted, and much of the credit for this successful growth is due the national association, the speaker emphasized. N.R.M.C.A., as a parent group, has furnished leadership and invaluable information and has participated extensively in state group programs. The national association's policy with respect to state and area groups, Mr. Shiely indicated, is that the efforts of these groups on the local scene will help the industry on a nation-wide scale.

It was also suggested that state groups, which benefit from the efforts of N.S.G.A. in matters affecting industry members throughout the country, should recognize such efforts with financial support.

State Association, Highway Department Co-operation The construction and maintenance of the highways, which are such an essential factor to the economy of this country, requires the joint efforts of many partners. This premise, advanced by Ralph Simpson, engineer-director, Indiana Mineral Aggregates Association, was presented in a discussion on co-operation with state highway departments by state and area associations on common problems of the aggregate producer.

Aggregates represent the largest volume of material used by highway departments—a fact often overlooked since the cost of these materials is so much lower than other items used in highway construction that the true volume relationship becomes obscured. Due to this situation, inexperienced administrators sometimes minimize the role of aggregate production. Therefore, Mr. Simpson indicated, one of the first areas of co-operation could well involve educating them on the critical part played by aggregates.

Another important area of co-operation concerns development of aggregate specifications. By blending the theoretical approach of the highway engineer with the practical conditions of available deposit characteristics and production factors, the greatest degree of suitability can be attained.

Constant vigilance over highway funds—to forestall diversion to unrelated activity—represents another opportunity for the state association and its members to play an important role in the area of highway construction.

It is imperative also, said Mr. Simpson, that the industry co-operate with basic research of highway departments, and that this research "continue until a more appropriate concept of the proper functioning of aggregates, as well as the other ingredients of construction mixtures, is established."

State-wide Collective Bargaining Labor relations formed the background for the organization of the Connecticut Ready Mixed Concrete Association, according to a discussion presented by Clifford R. Oviatt Jr., executive secretary of that group, on *Collective Bargaining with Unions on a Statewide Basis*.

Prior to the founding of the Connecticut association in 1957, Mr. Oviatt had furnished legal counsel in labor relations to a couple of ready-mix operators. The latter, and many others, were not satisfied with existing representation by a heavy construction association in labor contract negotiations. This was due to the fact that heavy construction, such

as road building, was but one of the many facets of ready-mix operations, but labor negotiations were confined to that area alone.

In order to solve this problem, the Connecticut producers formed their association, which undertook the negotiation of a labor contract specifically covering their operations. One of the major difficulties in this effort arose from the fact that Connecticut, a highly industrialized state, is only 35 miles from metropolitan New York, and the wage pattern of the latter became a factor by proximity.

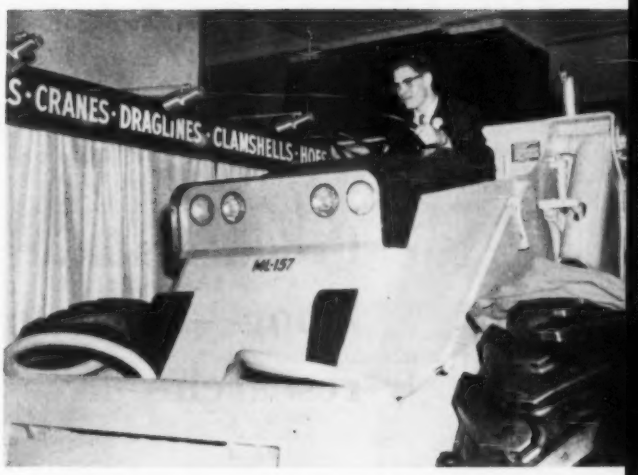
Education of union negotiators on the specifics of the ready-mix industry was a primary objective of the newly-founded association. The improvement over the former negotiation representation is evident in the fact that union men did recognize certain factors unique to this industry. Compromises were arrived at in setting up the labor contract early in 1958. While the union got a statewide rate, the association obtained a spread of the rate over the three-year period of the agreement.

This agreement has been very successful, Mr. Oviatt noted. To date, there have been only three cases requiring arbitration, and all involved disciplining of employees. Producers have also been given 24-hour notice by the Teamsters prior to their honoring the picket lines of a struck project.

With the formation of their association, the Connecticut producers now have a strong united front. All labor relations of the membership are channeled through the association counsel. There are still problems, Mr. Oviatt admitted, but the pattern for improvement has been established.

Organization for Group Action The highly successful and progressive program of the Montana Ready-Mix Concrete & Products Association was detailed by W. E. Carson (president, Helena Sand and Gravel Company, Helena, Mont.). Most concrete construction in the state is supplied by ready-mix operators, Mr. Carson pointed out, and due to the distances between population centers, these producers must deliver over distances up to 75 miles.

A 10-year-old organization, the Montana group was one of the first four associations formed in western states. Its steady growth has resulted in a current total of nearly 60 active and associate members. The principles established by its founders still stand; they include: (1) procurement and distribution of pertinent information; (2) education of both the public and the membership; (3) promotion of products; and (4) central organization for aid to members.



Already an experienced equipment operator, Jim Gurlea Jr., 15-year-old son of the owner of Gurlea Sand & Gravel, Salem, Ohio, typifies the interest and enthusiasm displayed by visitors to this record-breaking combined biennial equipment show.

Accomplishments are many, it was reported. Through its association, the industry was one of the first in the state to provide members with an insurance program. Labor relations and employer-employee relationships have been improved. Also in the realm of management, surveys have been made on labor scales and price cost ratios. The establishment of state-wide minimum safety standards was another accomplishment.

A current project is the development of standard ready-mix specifications for state-wide application. An annual activity, in conjunction with state agencies and the P.C.A., is a concrete school, or workship, on the use and application of the industry's products.

Co-operation is obviously a by-word with the Montana association. Not only have its members benefited from their group actions; but in desiring to further the cause of the industry even beyond the boundaries of their state, they regularly invite producers from surrounding states and neighboring Canadian provinces to attend their annual meetings.

Group Action Opportunities Stating himself to be a firm believer in industry associations—depending on the type of work being carried on—J. A. Nicholson (president, Nicholson Concrete Company, Toledo, Ohio) discussed the opportunities for group action by state or area associations, as seen from the businessman's point of view.

Pointing out the invaluable assistance rendered in areas such as law, technology, etc., by the two national groups—N.S.G.A. and N.R.M.C.A.—Mr. Nicholson stated that comparable benefit can be realized from group action at the state and local level. Through advice and interpretation of enacted or pending state legislation, a state association can provide excellent service. As such, the association can be termed a "protective agency in preventing enactment of legislation that might cost each producer in one year what his association dues would amount to in 10 or 15 years."

Association dues amount to an investment, Mr. Nicholson stated, and through this investment, plus participation in association activities, a producer can expect to realize additional profits. These profits take the form of assistance on almost any conceivable problem faced by the operator—legislation, cost control, management and labor, safety, public relations, and many others.

Turn page for PART II

44th ANNUAL N.S.G.A. CONVENTION continued . . . .

*PART II:

Producers hear the latest on: labor—engineering—operating research—taxes—administration

** For the convenience of readers whose primary interests lie in particular areas of the many subjects covered throughout the convention, we have assembled the various specific topics here in PART II. They are presented under general categories, such as:* MANAGEMENT, OPERATING, LABOR, ENGINEERING, *etc. Under these primary headings will be found discussions of pertinent individual factors.*

★ MANAGEMENT CONSIDERATIONS

Group Insurance A conference on the N.S.G.A. - N.R.M.C.A. group insurance and retirement plans furnished several pertinent details presented in discussions by Henry H. Kirwin (treasurer, Eastern Rock Products Company, Utica, N. Y.); James A. Murphy (president, Arizona Sand & Rock Company, Phoenix, Ariz.); Donald E. Shepherd, plan consultant; and Ken Tobin, associate executive secretary of N.S.G.A., group administrator.

First put into effect in 1953, the associations' plan has registered an impressive growth, Mr. Shepherd indicated. Basically providing life insurance, the plan also incorporates accidental death and comprehensive medical payments for members' employees and their families.

Charles E. Brady (Lilesville, N.C.) presided over the conference on the associations' group insurance and retirement plans. The session brought out several important benefits realized in many fields, ranging from employee relations to labor.

Company size makes no difference for plan participation, it was stated. Presently, there are 125 member companies, and effective coverage for life insurance, accidental death benefits, comprehensive medical payments, and employee dependents benefits total $130,000,000.

An important factor in successful labor contract negotiations last year between Arizona aggregates producers and union representatives, according to Mr. Murphy, was the association's group insurance plan. Negotiations preceding the expiration of labor contracts last year had proved non-productive. The union demanded a 10-cent-per-hour welfare fund—to be jointly administered by the union and the producers. The latter wanted to handle it alone.

This problem cut across competitive barriers and resulted in the formation of a united front by the Arizona Aggregates Association. This group, with a common objective, approach, and policy, sought a counter measure to union demands. Having checked several carriers, it was found that the N.R.M.C.A.-N.S.G.A. plan was superior to others. With certain modifications made by the plan trustees, the Arizona producers found themselves with a plan that provided their employees more benefits than the union's proposal. The resultant compromise labor contract provided for a 7½-cent fund contribution along with the operators' insurance plan.

Some interesting benefits have been realized, Mr. Murphy stated. For one, the Arizona Group has been bulwarked by having the prestige of a national group behind it. For another, the members' employees have had the opportunity to see the superiority of their coverage over that of construction workers in Arizona, who are under the union's plan, and this has brought them closer to their employers.

Other state groups may well benefit from the step taken by the Arizona operators, it was suggested. The former can find themselves in the position, if they choose, of confronting a union negotiating team with a plan that has previously been accepted by representatives of the same union. It also presents the opportunity of avoiding union domination by countering demands with a better plan.

Expansion of an existing program through the addition of the N.S.G.A. plans was described by Mr. Kirwin. The latter step was taken by his company in 1954, and it led to the redesigning of the entire

employee benefit plan package.

In 1955 the profit-sharing pension plan was added to foster employee savings and retirement security. The company makes the full contribution required under the plan terms, but the employees may add to this amount up to 5 percent of their annual pay.

Several advantages have been realized by the company since these plans were instituted, Mr. Kirwin stated. There has been a considerable gain in incentive and productivity. Efficiency has improved since the men are more conscious of the results of their work. Morale is even higher, bolstered further by the fact that the men can, if they wish, take advantage of counsel by plan representatives on such problems as education needs, estate arrangement, etc. Turnover of personnel has also dropped sharply; since 1955 only two men have left the firm's employ. The effects of all the foregoing benefits make it evident that the plan has paid for itself, Mr. Kirwin indicated.

Transportation No. One Cost The biggest cost item in the sand-and-gravel industry, according to Ellis E. Jensen (Janesville Sand and Gravel Co.), is transportation to market. The product usually sells for less than a dollar, but the rail haul averages $1.42 per ton, and this is the only major industry in which such a condition exists. Producers install expensive equipment to reduce costs a cent or less, but railroad rates go up 5 or 10 cents at a time. Mr. Jensen said that this is a precarious situation as deposits and equipment must be bought 20 to 50 years ahead, but the producer has no control over transportation costs, and there is no assurance on future railroad service.

Railroad shippers are in further jeopardy because the I.C.C. Cost Finding Section declares that almost all short-haul traffic, which embraces most sand-and-gravel tonnage, is unprofitable to the railroads. As a result many railroads do not want sand-and-gravel traffic and therefore ask prohibitive rates; so sand and gravel and other short-haul volume continues to fall off, and earnings do not improve.

Proposed increases were defeated on November 17 last at a hearing in New York City, but it was a close call, according to Mr. Jensen. N.S.G.A. and others were heard, and the eastern carriers were asked to make an independent study of the costs of short-haul traffic before pricing it off the rails. According to Mr. Jensen, "It is high time, therefore, that we blast away ignorance, misinformation, and defeatism about the railroads and their earnings, which are the cause of our precarious existence as rail shippers."

Railroads, like other monopolies such as gas, water, telephones, etc., are required to serve the public at a reasonable cost. Railroads claim that profits after taxes were only 5.2 percent in a good year (1956) and 3.5 percent in a poor year (1958). This statement, said Mr. Jensen, is based on all traffic, with freight compensating for passenger traffic losses. On freight traffic alone the railroads made 10.4 percent in 1956 and over 8 percent in 1958. These figures compare very favorably with those of any other large industries and are far ahead of many.

Rail freight profits in 1958 were $1,372,000,000, but $610,000,000, or 45 percent of this, was lost on passenger service, leaving a net operating income after taxes of $762,000,000.

Freight shippers should not be expected to assume these passenger losses, Mr. Jensen said. Railroad passenger service, especially commuter service, is a public service which could be replaced only at a stupendous cost. Passengers now pay only half the cost of this service and should pay more, and cities should subsidize it as they do other services. If freight rates are held at reasonable levels, if good business practices are followed, and if short hauls are accepted, the railroads should prosper.

Land Reclamation *Does Land Reclamation Pay for the Sand and Gravel Producer?* was the thought provoking subject of Donald I. Battjes (Grand Rapids Gravel Co.). He proved that reclamation definitely can be made to pay, and that as a result of the dangers inherent in leaving a worked-out pit lie, reclamation is

Donald I. Battjes, Grand Rapids Gravel Company . . . land reclamation pays off in return of investment, improved public relations, securing additional reserves, and personal satisfaction.

a must. His company for many years has followed a planned conservation and reclamation program, which has resulted in the following benefits: (1) recovery of the money invested and more, (2) improved public relations, (3) aid in securing more land, and (4) great personal satisfaction.

Planning well ahead is necessary in selecting a new property. After selecting a potential property, Battje management develops a plan for its future use, takes the entire plan to the local planning commission, and then lets the public know about it. The newspapers, he said, are just as ready to present good as bad publicity; and his company's plant first got local, then state, and finally, national news coverage. Getting a property rezoned for sand and gravel use is much easier if you can show what will be done with it and guarantee to do it.

Slides were used to show how a sand and gravel property is excavated to fit the final plan for development. They also showed the schools, churches, parks, playgrounds, homes, and factories already built on worked-out areas of the Battjes firm. According to Mr. Battjes, this reclamation work has paid for itself many times over; but the real satisfaction lies in the resultant good will, and even in having public parks or residential developments named after you or your company.

Managing A Growing Business A stimulating and informative talk on *Successful Management of a Growing Business* was given by Dean James L. Hayes, School of Business Administration, Duquesne University. He pointed out that the only difference between a large business and a small one is a man's ability to manage. Large businesses are built by men who are capable managers.

To become a good manager,

you must study and learn to be a manager. You must break away from labor and learn more about finances, leadership, etc. Every manager plans, co-ordinates, controls, organizes, and delegates authority to those under him.

A man who plans knows where he wants to be in the future and takes steps to get there. There are three steps in planning: (1) set an objective; (2) have a time-table, so that you know whether you are accomplishing what you want to within a reasonable period of time; (3) build in your controls and means of checking progress. Thus you are sure of what has been done and of what you can expect to do in the allotted time.

Organizational ability is necessary in a manager because each man under him must be told what is expected of him. Each man is given his own individual goal to reach; and as each man's goal is reached, the ultimate goal of the manager is also attained. This is organization.

A certain amount of authority must be delegated to achieve good management. Subordinates should be permitted to make decisions of a preliminary nature, help them develop their thinking along these lines. If these men are to grow in stature, they must develop a sense of judgment. Managers fail because they don't properly delegate assignments to the men under them.

Co-ordination is necessary in business because one group must mesh with another. Without co-ordinated effort, each group would operate independently, and confusion would soon set in.

Company communication is also important. Information about the company should be communicated to subordinates, so that they know what is going on. This kind of communication builds morale; it also prevents rumors.

Control is the final requisite in good management. It is done by charts, graphs, and statistics. Control tells you whether your plan is on schedule. It also tells you whether you are reaching your goal. If you are off-beam, you, as a manager, will have to find where the fault is. A successful business is built around a successful manager.

N.S.G.A. Fiscal Binder The report of the Joint Committee on Fiscal Policies was given by its chairman, Henry H. Kirwin (Eastern Rock Products Inc.), who told of the looseleaf ring binder on fiscal matters which will be ready by mid-year. This will be similar to the one on public relations, and will have six sections—for fiscal accounting, cost accounting, budgeting and forecasting, industry cost ratio studies, and general matters.

Self Insurance Self insurance can probably not be made to pay by any company with less than 250 employees, but management of many smaller firms think it is a sure way to effect savings, according to S. James Campbell (Harry T. Campbell Sons' Corp.). Insurance companies retain 60 percent of premiums for payments, and would-be self insurers should analyze the expenses for which the other 40 percent is used before going into such a project. Self insurers, he said, must keep files, get witnesses and reports, and follow various other procedures which require much work, time, and help.

Reserves must be set aside, a separate checking account must be kept, etc. Safety programs are necessary, and self insurers should have a safety expert. Insurance rates for the sand-and-gravel and crushed stone industries are among the highest; so a company with an excellent safety record could profit by self insurance.

The Campbell company began its own insurance program in the 1930's because of the high rates and has saved an average of about 15 percent. Other benefits resulting have been better employee relations and better defense against union pressure. This company lined up the best doctors and surgeons available and got to know the employees and their families personally. Mr. Campbell warned that adjustments must be fair. He pointed out that having the same lawyer on all cases helps in many ways. Employees are kept fully informed of their rights.

Planned Expansion Intelligent planning for future expansion is a necessity, said Ward W. Anderson (Albuquerque Gravel Products Co.). It has been of great help to his company in deciding whether to expand existing operations or build new ones at other locations. In ready-mixed concrete, the problem is to forecast the future available market. This is done by getting government population growth data, labor market information, market analyses, etc. The state, chambers of commerce, school boards, and power, gas, and telephone companies are all good sources of information. These can tell only the prospective population growth and to some extent also the probable areas of greatest growth. Building permits, etc., compared with the firm's own sales, show whether or not sales *per capita* are increasing; and, as the curves are nearly parallel, it is possible to project up to 10 years ahead fairly accurately.

Growth charts and studies on all elements of costs are used, and it is possible to determine the directions in which growth is *unlikely*. Land can then be purchased in the right areas, well ahead of needs and at a reasonable price. If wrong decisions are made, the land can always be sold at a profit; if right, the company can have an ideal location from the standpoints of traffic, neighbors, etc.

Other factors must also be taken into consideration when sand and gravel production must be increased, but the same basic principles also hold. In such cases the company also gets the advice of a planning firm before selecting a location.

Machine Accounting The advantages of machine accounting were described by R. O. Evans (Concrete Supply Co.). One of these is the ready availability of financial information at all times, providing a basis for many important business decisions. It helps both employee and customer relations, and forces improvement of other office procedures. The original cost of a machine accounting system, Mr. Evans said, varies from $1,500 to $6,500, depending on the size of the installation. Allowance should be made for future growth.

The logical time to put in such an installation is when staff expansion is being considered and before

records are too far behind. Mr. Evans advised first looking over other installations, implementing gradual conversion, and getting an experienced operator—the latter because no system is foolproof. Time clock and other systems should also be arranged to fit the setup. If a company has several offices, it is better to centralize on one system by mail than to set up a separate one for each office.

Credit and Collections Sound collection policies, lien laws, and surety bonds are in a "package" and should not be separated, according to George C. Eady (Consumers Supply Co.). The collection policy of a medium-sized company should be consistent; if there is a 10-day cash discount policy, it should not be broken as this practice can offend some of the best customers. The use of such discounts is advised to promote prompt pay habits; it also helps customers to establish credit elsewhere. City credit information should be used for present and possible future customers.

Salesmen should be kept advised on client's credit status, but they should not be used as collectors. Such information, said Mr. Eady, also keeps salesmen from calling on undesirable customers. He advised against letting friendship enter into credit decisions, and also against using tough collection policies.

A change of interest with respect to surety bonds is the availability of the same protection on private work as on federal. A lack of understanding of lien laws is a big handicap. Both local and state laws should be studied. Competitors should also be encouraged to use liens as it keeps customers in line and makes them jealous of their credit.

Sound collection policies, lien laws, and surety bonds together are necessary for a sound and effective credit policy. All three are not needed in all cases, but it is good to have the trade know that they can and will be used when necessary.

Cost Accounting The proper use of a cost accounting system helps management to make important decisions, stated James R. Spear (Dolese Company). In such a system each plant and shop should be treated as a separate entity, and each should be adjusted at least to break even on a business basis.

★ CURRENT TAX PROSPECTS

Percentage Depletion The entire subject of percentage depletion is still very controversial, according to John T. Sapienza, counsel for the associations, and is again under attack in Congress. There were no new laws passed in 1959 affecting its status, but several bills were introduced and several are now under discussion, most of them unfavorable to the industry. All court decisions during the year were favorable to the taxpayers, except a few involving bagging.

The most important decision was in the Cannelton Sewer Pipe Co. case in which the Supreme Court in December granted *certiorari*. This case, he said, overshadows all others in importance as it will probably be a guide for all future decisions on the cut-off point.

The Cannelton company mines clay and shale and makes sewer pipe. As this type of clay is sold nationally for about $1.00 per ton, the question is whether the company should get 15 cents (based on "ordinary treatment processes") or $4.08 per ton allowance. Should the Supreme Court rule in favor of the company, Mr. Sapienza feels that the Treasury Department will then find the lowest-cost producer in an industry and use it as a guide.

The final percentage depletion regulations were issued in January, 1960, three years after the proposed regulations were made public. According to Mr. Sapienza, these regulations do *not* define several important subjects, such as aggregate treatment processes, because the Treasury Department wants to wait for the decision in the Cannelton case. The final regulations do touch on economic interest, which is of interest to river producers; they must have an investment in the minerals in place.

No producer can get percentage depletion unless he has some *economic interest* in the minerals in place. The owner, lessee, operator, etc., all qualify. A federal or state permit or a lease on a river gives economic interest.

Aggregation of mineral properties is under review, and changes must be awaited. The 1954 Code, Mr. Sapienza said, first provided for aggregation, but as one unit. As this was unfair to some, new rules were issued in 1958, which permitted aggregating many properties under one. These properties need not be contiguous, and if they serve one plant, this helps; but two plants far apart have no chance. Separate percentage depletion is still permissible, he said, even when a firm has aggregated mineral deposits.

I.R.S. Operations The top man in the tax field, Dana Latham, Commissioner of Internal Revenue, spoke on the topic, *How Does The Internal Revenue Service Operate?—Some Observations.* Mr. Latham told of two major problems confronting the Internal Revenue Service in determining percentage depletion. One is the need to define each mineral . . . a problem that is very difficult in cases in which the commercial names commonly used are not in exact agreement with the technological meaning of these terms.

Enlightening observations by Dana Latham, Commissioner of Internal Revenue, furnished his audience with information on operations and objectives of the I.R.S.

The other problem is in determining the gross income from the *mining* operation on which the depletion is to be based. This necessitates the need to determine when the mining operation stops, and some other operation begins. It is also necessary to establish the value of the mineral at this point.

Because of the many products

turned out in the nonmetallic minerals field, it is exceedingly difficult to fix a generally applicable cut-off point.

Two hypothetical cases were given as an example of this problem. One was a dredging operation producing sand for aggregate to be used for highway construction. The other was a dredging operation producing sand for expensive glassware which is being manufactured by the same company. Determining the cut-off point in the first case is easy, but in the second case it is much more difficult.

Mr. Latham also described the structure of the Internal Revenue Service and the method in which it operates. Today the I.R.S. has approximately 50,000 permanent employees who are headquartered all over the United States. These people process almost 100 million tax returns of all kinds, plus 250 million other documents.

Decentralization of the I.R.S. helps the taxpayers conduct their tax matters close to home, and also avoids delay. It also prevents overcentralization in Washington. Internal controls are provided, however, so that there is a reasonably adequate assurance that offices throughout the country treat taxpayers in a uniform manner.

After the returns are filed, they are separated into a number of different categories, according to size and type of returns. They then go to the Audit Division, which decides which returns should be audited, and also conducts the audits on the returns selected. Audits are not made because there is a feeling that the returns are dishonest; they are made to make sure the taxpayers are interpreting the tax law properly. Another reason audits are made is to find out whether there are any mathematical errors in the returns.

The success of the audit program and the agents who carry it out is confirmed by the fact that over 98 percent of all potential tax controversies are disposed of at audit level. Less than 2 percent of the cases involving proposed deficiencies have to resort to informal conference procedures.

Controversies not settled at the audit or informal conference level go to the Appellate organization. Approximately 17 out of 18 cases received by the Appellate in the fiscal year of 1959 were disposed of by agreement between the parties.

In conclusion, Mr. Latham urged members, in dealing with tax agents, to believe that the latter are as anxious as producers to reach fair and reasonable conclusions. They have a difficult and often thankless job to perform; consequently they need and ask the operations for support.

Internal Revenue Code At one of the joint meetings John T. Sapienza, counsel for the associations, reported on developments to be expected with respect to the Internal Revenue Code. Congress, he said, is just now looking especially at depreciation and expense reports and is expected to make a thorough revision—but not in 1960.

Loopholes have been checked, hearings will be held, and data will be studied; but there will be no new law until 1961 or even 1962. However, there will be laws this year on corporate taxes, and the ordinary treatment processes may be studied and ruled on this year (depending on the outcome of the Cannelton case). This would probably be limited to the clay and cement industries.

Depreciation, said Mr. Sapienza, is one of the most controversial subjects in the tax field. Industry now pays only a small percentage on gains from the sale of depreciable property, but a new bill proposes the depreciation recapture method used in Canada and England. The present useful life provision leaves the extent of use up to the user. He can sell equipment as used or scrap but should gear his depreciation method accordingly. Present regulations are not clear, and if methods used are questioned, Mr. Sapienza advises settling for a reasonable amount and then setting up a more adequate system for the future.

With respect to expense accounts, Mr. Sapienza said that no detailed report is necessary if all the employee's expenses are reimbursed. If he has additional expenses, the employee must report all amounts received as advances, reimbursements, etc.; but if the unreimbursed amount is small, it is not worth the trouble of collecting. A written expense voucher is required, broken down in detail. Employees reporting to the employer only are also advised to keep duplicates of every expense report and record turned in as they may be asked for proof if the company report is questioned.

On automobile expense, no other accounting is necessary if the allowance is 12½ cents per mile or less. According to Mr. Sapienza, the government is looking for those who put personal expenses on their expense accounts.

★ DEVELOPMENTS IN LABOR

Griffin-Landrum Bill As pointed out by Herbert G. Jahncke (vice-president, Jahncke Service, Inc., New Orleans, La.), presiding officer of a session on existing labor laws, the highly-publicized excesses of some labor groups has ironically been somewhat beneficial — their exposure has led to corrective legislation passed in the last session of Congress. However, Mr. Jahncke stated, that legislation apparently falls short of curtailing much of the power enjoyed by labor leaders.

John J. Adams, Cleveland, Ohio . . . while this (Griffin-Landrum bill) is a "fancy" law . . . it is no better than its enforcement.

On the subject *How Does the Griffin-Landrum Bill Affect the Operations of the Sand and Gravel and Ready Mixed Concrete Industries?* John J. Adams (Squires, Sanders & Dempsey, Cleveland, Ohio) indicated that possibly it may only be a factor in isolated instances.

However, there are certain considerations in which caution is indicated. In view of union attitudes

and frequent control over local law, it is probable that picketing counter to the provisions of the Griffin-Landrum bill will continue. While this is a "fancy" law, the speaker said, it is no better than its enforcement.

Nevertheless, substantial improvement has been reached concerning the rights of the rank-and-file member in his union. Under the law, he may now nominate any candidate he chooses for union office, and may cast a secret ballot. He may also obtain copies of labor contracts negotiated between his union representatives and his employer—and union by-laws to the contrary cannot abrogate this right.

This is meaningful only, Mr. Adams emphasized, if the men take advantage of these rights—and it is incumbent upon employers to make sure that their men are familiar with them.

The new law also takes official cognizance of the fact that union officers are in posts of trust. They are required under the law to refrain from illegal dealings; they must be bonded; they must file annual reports on stock or other financial interest in firms with which their union groups deal; and—if a former felon or registered Communist—he cannot retain office.

Regulation of union business affairs is also now a matter of law. Each union must have a constitution and by-laws—these to be filed with the Secretary of Labor—and reports must be made on meetings, elections, disposal of dues, fees, etc. In addition, a detailed financial statement must be filed annually on salaries, expenses, and other monetary transactions.

Employers, too, are subject to certain provisions of the law. They must not pay or lend anything of value to any union involved with their operations. Nor can they finance a candidate for union office, including their own employees.

Possible sources of trouble in the new legislation, as pointed out by Mr. Adams, include "pre-hire" contracts, and "hot cargo" clauses. The potential difficulty stems from the fact that these relate to the "building and construction industry," and as yet there is no definition as to who will be included in that category.

Wage, Hour Laws Some of the factors affecting sand-and-gravel and ready-mix operations were brought out in a discussion presented by Charles A. Horsky, counsel for the associations, on the query, *Where Does the Industry Stand in Relation to the Federal Wage and Hour Law, the Davis-Bacon Act, and the Walsh-Healey Act?*

Charles A. Horsky, counsel for the associations, reviewed the factors in various wage and hour laws affecting these industries.

Each of these three statutes is a wage law, Mr. Horsky noted, and two are hour laws, as well. The Davis-Bacon and Walsh-Healey Acts were depression statutes, and should have been repealed when the wage-and-hour law was passed, the speaker stated. However, labor unions brought pressure to bear not only for their retention, but for their strengthening.

The minimum wage and hour law was described as applicable to these industries if a producer is supplying an "instrumentality of commerce." It does not apply if he is supplying materials to the construction of production facilities that will be involved in interstate commerce.

Under the provisions of the Davis-Bacon Act, prevailing wage rates must be paid employees involved in construction if federal aid exceeds $2,000. It does not apply to aggregate or ready-mix producers if their only connection with such projects is that of materialmen. However, if they should open a pit or plant for the express purpose of supplying this construction, they come under the act's provision.

While the Walsh-Healey statute is only rarely applicable to these industries, Mr. Horsky pointed out, it does govern in the event of a direct contract, involving more than $10,000, between a producer and the Federal Government. There has been a misconception that this law when applicable, as above, relates only to production and delivery employees. Under certain conditions, no employees come under any of the law's exemptions, and all are then affected.

★ ENGINEERING AND RESEARCH

Aggregate Tests In discussing the *Significance of Tests of Concrete Aggregates,* Delmar L. Bloem (associate director of engineering, N.S.G.A.-N.R.M.C.A.), said that the salability of aggregates for concrete depends on their ability to comply with applicable specifications—and specifications depend on tests.

"The development and enforcement of specifications for concrete aggregates present a most difficult problem," he stated. "There is no doubt that aggregate characteristics have profound effects on concrete quality. But just what the significant characteristics are, and how to evaluate them, is not clear-cut, in spite of all the research which has been done. More research is needed. conducted by those who have an understanding of the problem's difficulties. . . .

"The significant characteristics of aggregates can be very simply stated, but that will not help much. They should be 'well graded.' They should be 'hard and strong'—and we might better say 'hard and strong enough.' They should be 'durable', and they should be free from injurious quantities of 'deleterious substances.' There is, of course, an overlapping among these characteristics—durability being associated to some extent with hardness or strength and, to a great extent, with deleterious substances."

Grading, said Mr. Bloem, has an indirect effect on strength, durability, and other characteristics; but grading specifications usually permit fairly wide differences in size distribution, so that economically available materials can be used. The uniform quality of the end product depends on the closer control of the grading variations within the overall tolerances.

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Hardness and strength are difficult to measure and evaluate. "All of the various physical tests for aggregate strength leave much to be desired from the standpoint of quantitative significance," Mr. Bloem admitted. "That is, they generally provide little direct indication of potential performance in concrete. On the other hand, they have the advantage in most cases of being based upon describable testing procedures, not susceptible to the subjective judgment or personal whimsy which might be involved in some sort of overall evaluation system."

Soundness and deleterious substances are related problems which are also difficult to measure and evaluate. Mr. Bloem stated that there is little doubt that "deleterious substances" and "soundness" provide more food for controversy than any other items in concrete aggregate specifications. "Not only is there much difference of opinion as to the significance of tests related to these properties," he commented, "but there is also wide latitude for error in the determinations themselves, due to lack of precision in definitions and test methods.

"The intent of this discussion has been to point out problems associated with evaluation of aggregate quality and determination of conformance with specifications. Because of the nature of aggregates, with their multiplicity of sizes and types of rock—often covering a wide range in quality even within the same type—it is not surprising that definitive tests are difficult to devise. The results often are related only in a very general or qualitative way to actual performance, with no sharp line separating an acceptable from an unacceptable result. Added to this, is the further complication that the tests themselves may be subject to considerable variation or personal judgment, and they all depend upon the securing of representative samples.

"From the viewpoint of the specifier, the problem takes on a different aspect. He needs a specific quantitative basis for saying 'Yes' or 'No'. From experience and judgment, he sets test limits which he hopes will separate the good from the bad among economically available sources. Thus, establishment of a 10 percent limit for the sodium sulfate test does not mean that a loss of 11 percent portends failure, while 9 percent assures good performance. It more probably means that in a given locality, aggregates with good service records have normally had soundness losses of less than 10 percent, while failures have been associated with higher losses . . .

"This system is certain to cause some injustices. Arbitrary limits for procedures as non-specific as those avaliable for testing aggregates will sometimes result in rejection of better materials than are accepted. On the other hand, there seems to be no practical alternative. It is doubtful that, in the usual case, pure judgment on the part of the materials engineer would provide a suitable substitute. Even assuming that he has the necessary background, service record information, and wisdom to make a choice, his decisions will be subject to so much advance pressure and *ex post facto* criticism as to place him in an impossible position. He needs the refuge of specific numerical bases for his decisions. Perhaps the producer should also be grateful for this system. At least, he has a better chance of knowing where he stands than if he were dependent upon the judgment of an individual.

"It does not follow that the aggregate industry need sit back and resign itself to being judged and sentenced on the basis of limited-significance tests. Where a requirement is demonstrably prejudicial to a material or class of materials of good quality, that requirement should be challenged. All specifications should be continuously examined for desirable changes in limits or substitution of new and better bases for estimating performance.

Finally, full co-operation should be given to the development of more significant methods of evaluation. Performance tests and field service records appear to offer the most promise. It is not inconceivable that performance criteria can be used to evaluate a source at fairly infrequent intervals instead of depending upon day-to-day or shipment-to-shipment routine testing."

Engineering Report The annual report of the Engineering Division presented by Stanton Walker and Delmar L. Bloem (respectively, director of engineering and associate director of engineering of both associations) was not read at the convention, but was sent by mail to all members in advance of the meeting. The length of this report, in spite of its being condensed to the minimum, and the variety and importance of the services its describes, shows evidence why N.S.G.A. and N.R.M.C.A. and their engineering staff rate so highly in technical and engineering circles. The authors of this report classify this work, generally, as follows:

1. **Engineering research** at the jointly sponsored laboratory at the University of Maryland (discussed in more detail later).
2. **The preparation and distribution** of a wide variety of publications, many of which stem directly from the laboratory research.
3. **Representation of the industries** in technical committees of organizations such as the American Society for Testing Materials, the American Concrete Institute, the Highway Research Board, the American Railway Engineering Association, and others. Also, representation of the industries on engineering problems before various divisions of government — federal, state, and city—and before other consumer groups. Laboratory research, publication program, and committee activities are all important antecedents to the effective performance of such work.
4. **Conduct of the annual Short Course** at the University of Maryland. This year was the 14th. Accumulated attendance is 1,448, including reporters, and 1,231 not including them. In this same type of activity, lectures and speeches are presented before a variety of groups, including, importantly, local associations of the industries and local organizations of consumer groups.
5. **Performance of consulting services** to member companies and users of the industries' products, much of which is done by correspondence and telephone,

on a variety of subjects too numerous to list, and not readily classified.

Appended to the report was a summary of recent laboratory researches which we list as follows:

Series 164—Comparisons Between Portland and Portland-Blast-Furnace Slag Cements

Series 168—Additional Studies of Cement Variations

Series 169—Evaluation of Centrifuge Method for Determining Cement Content of Fresh Concrete

Series 170—Effects of Air-Entraining Cements on Strength and Durability of Concrete.

Series 171—Studies of Significance of Laboratory Freezing and Thawing Tests

Series 172—Comparisons Among Retarding and Water-Reducing Admixtures

Series 173—Relationships of Maximum Size of Aggregate to Strength Development of Various Classes of Concrete

Series 174—Cement Content of Field Concrete by the Centrifuge Test

J-125—Strength Variations of Cement after Extended Storage

Series J-126 — Uniformity of Bearing and Loading in Testing Machines

Series J - 127 — Co-operative Study of Aggregate Gradings for Masonry Mortar

Series J-128—Effect of Properties of Capping Materials on Strength of Concrete Compression Specimens

Series J-129 — Relation Between Mortar and Concrete Strengths for Sand Failing Mortar Strength Requirement

The list of 27 publications issued during the year is equally impressive, but much too long to be reproduced here. Each member of the two associations receives a complete copy of every engineering research report and every publication.

Research Review Research projects completed in the joint facilities of N.S.G.A. and N.R.M.C.A. at the University of Maryland were noted by Mr. Bloem, who also outlined future studies to be made.

One research project, on the relation of concrete strength to maximum size of aggregate, revealed indications that contrary to accepted opinion strength was not necessarily enhanced by using the largest practicable size of aggregate. To bear out this premise, a more comprehensive investigation was made—involving four maximum sizes of coarse aggregate, from ⅜ in. to 2½ in.; three cement factors, from 4 to 8 sacks per cu. yd. in both normal and air-entraining concrete; and four test ages from 7 days to one year. At present, all tests have been completed, with the exception of the one-year strength test.

The conclusion of the test was that regardless of cement factor, presence or absence of entrained air, or age at test, compressive strength was best for the small or intermediate aggregate sizes. The same was found true for flexural strength and for tensile strength as measured by the splitting test.

Mr. Bloem also reported on a group of supplemental tests related to the associations' cement program. Samples from the original project, preserved about three years in sealed containers, were retested to see whether aging might have affected their strength levels, or the degree of sample-to-sample variation. Four samples from each of the five outside sources were selected to represent a range in strength level as originally measured. They were tested for strength under conditions as nearly identical to those as originally measured as possible.

Comparison between results from the original investigation and those from the retests indicate that the three-year-old samples developed constantly lower strengths than the fresh samples. The degree of reduction was the same, regardless of strength level, amounting to about 10 percent. Tests of the aged samples showed no increase in loss on ignition, indicating that the strength reduction was not due to the samples' having picked up moisture.

★ PLANT OPERATIONS

Dravo Dredge Changing markets and new specifications for quality concrete — constant problems for all aggregates producers—caused the Dravo Corporation, Pittsburgh, Pa., to undertake a critical analysis of their situation three years ago.

As indicated by W. L. Price (manager of engineering and materials of Keystone Div.), the picture was not promising. Existing production equipment (two dredges) were inadequate in view of potential long-range demand, and approaching obsolescence was a major obstacle to the goal of meeting more stringent specifications.

W. L. Price, Dravo Corporation . . . the river is our lifeline.

Several possibilities were explored to determine whether the existing type of operation was feasible to continue, or whether an alternative system should be considered. The latter included study of a land-based processing installation, to be supplied with "run of mine" material from a simple excavating dredge.

Results of this study emphasized the fact that while dredging could be carried out almost anywhere along the 100-mile length of river that coincides with the market area, the projected cost of extra barging of raw material to a land plant and of transporting finished material from there to distribution points would become prohibitive. Another serious problem with such a plan involved the disposal of excess unsalable material—a matter of some difficulty for a shore installation.

Anlaysis of all factors led to the decision to continue operating floating processing equipment. This step raised the question as to whether to attempt to modernize existing units, or to construct a new combined dredge and plant. In weighing costs against desired versatility and capacity, it was decided to build the new unit—Dravo Dredge No. 16.

The big splash came in April of last year, when the dredge, virtually complete, was launched. By July, the last of the equipment had been installed, and the dredge had been placed in operation.

A number of interesting and outstanding design features are found in the new equipment, as described by Mr. Price. Rated at an average production of 500 t.p.h. in a balanced deposit, the new dredge has a 100-ft. digging ladder. It incorporates a complete H.M.S. beneficiation plant, seven screens (in addition to the H.M.S. circuit), an 8- by 14-ft. scrubber, a 150-hp. reversible impact type crusher, an 8- by 32-ft. classifying tank, and a twin sand screw.

All of the above, plus auxiliary equipment, is mounted on a 53- by 200-ft. hull which, with superstructure, was designed to clear a 9-ft. channel, and pass under a 68-ft. bridge clearance. The compartmented hull also has a 30,000-gal. fuel oil storage to permit 500 hours of operation without refueling.

Normal production of four sizes of aggregate within a range of 1½ in. to 0 are simultaneously loaded into four barges *via* folding loading conveyors. Among the special requirements comprehended in the design is the ability to switch instantly from loading of fine sand to concrete sand, or to reblend separated fractions to almost any specification.

Beneficiation A *"One-Two Punch" Beneficiation System Combining Heavy Media and Elastic Fractionation* was described by Robert F. Guise (Whittaker & Gooding Company, Ypsilanti, Mich.). The development of this system is typical of effort expended by gravel producers to meet higher product standards while simultaneously facing the problem of diminishing reserves of top grade raw material.

Robert F. Guise, Whittaker & Gooding Company . . . combined beneficiation systems have been effective on a glacial deposit described as a "Duke's Mixture."

"We had a Duke's Mixture," Mr. Guise commented in describing the glacial deposits at the firm's Clear Lake and Scio plants. Along with the sound igneous, metamorphic, and sedimentary limestone and dolomite constituents in the deposits, considerable chert, "hard-absorbent," and soft stones were present. The latter two include such materials as clastic stones, shale, weathered particles, ferruginous materials, and "iron nuts."

With these factors determined by prior test drilling, it was obvious that beneficiation would be required to produce specification aggregates. Almost simultaneously with the company's plans to open the Clear Lake deposit, the development of an elastic fractionation beneficiation system had been completed—a project in which company management had co-operated. (See PIT AND QUARRY, October, 1957, p. 88.) A pilot unit was installed at the Clear Lake plant, and subsequently, a larger model was added to the Scio operations.

These facilities successfully and economically produced a high-quality material—limited, however, to the Michigan "A" specification. The more rigid requirements of the "B" specification were not being met. It was found that selective excavating, plus adjustments to the beneficiation plant, would deliver the latter material—but at an excessive cost, and a reduction in operating efficiency.

During the earlier operation at Clear Lake, the ferruginous and soft, high-density materials constituted the bulk of the objectionable material; and their physical characteristics contributed to their most effective separation through elastic fractionation. Their density ruled out heavy media separation due to the relatively high specific gravity that would be required.

However, pit advance was accompanied by a substantial increase in chert content—a problem more readily solved by H.M.S. This posed the important question as to the feasibility of further capital expenditure on a second beneficiation system at the same location.

Increases in pre-stressed and other concrete markets requiring premium grade materials tipped the scales in favor of a decision to add H.M.S. for a combined system. Premium concrete meant "B" quality aggregate, and neither elastic fractionation nor a heavy media system alone could make the required separations.

A 100-t.p.h. sweep-drum type heavy media plant was installed in the Clear Lake operation a little more than a year ago. This step also involved certain revisions to existing plant flow in order to arrive at the most efficient handling and processing of feed for the two beneficiation units and achieve maximum operating efficiency in each.

The combined system displays several advantages, Mr. Guise stated. Through removal of the most dense, soft particles by elastic fractionation, the specific gravity required in the following heavy media plant for a given product quality was lowered. This reduction also lowered media cost and discard loss. Too, the particles noted above were eliminated prior to feed to heavy media separation, which could not have removed them. The application of elastic fractionation ahead of heavy media processing also reduced both the operating load and operating cost of the latter. Production-wise, the dual system has provided a balanced overall beneficiation, with each unit handling a phase that the other cannot.

Uniform Grading Control A discussion of *The Functioning of a Sand and Gravel Plant Designed for Uniform Grading Control* by John S. Walker

John S. Walker, Harry T. Campbell Sons' Corporation . . . flexibility is an important feature in the functioning of a plant designed for uniform grading control.

(engineer, Harry T. Campbell Sons' Corporation, Towson, Md.) brought the audience up to date on the operations of a plant first described in construction stages by the late Richard Campbell during the 1958 N.S.G.A. convention.

Flexibility is the outstanding feature of the operation, Mr.

Walker noted; it was paramount in developing the design. (See PIT & QUARRY, December, 1958, p. 86.)

The pit area from which the plant is supplied covers approximately 1,750 acres, and excavating is carried out in three sections. In one of these, dry-bank operations recover material consistently on the fine side. A central area, both wet and dry, furnishes most of the coarser fractions; and the third section, primarily a wet pit, supplies the most homogeneous, well-graded material. Pit-run is transported to a pair of plant feed hoppers in trucks. One hopper is used for dry material, and the other for wet—thus furnishing the first material-blending phase, as well as attaining some moisture control of the feed.

A scalping screen house is provided between the foregoing hoppers and the 20,000-ton raw surge pile, which also acts as a blending system for pit-run material. This installation is probably one of the few in which waste is scalped ahead of surge.

From the latter point, the plant feed is conveyed to the screen house, where it is split to a pair of de-sanding screens, each the first unit in two parallel production lines. In addition to a de-sander, each line is equipped with two more batteries of screens (primary and secondary finishing), a scalping tank, coarse and medium sand screws, fine sand cyclones, and a log washer. This equipment makes a total of eight materials — 3 sand and 5 gravel splits—for reblending purposes.

The main objective, Mr. Walker pointed out, is to produce clean and uniformly graded materials in the screen house day in and day out, so that blending ratios can remain fixed. This goal is aided by (1) a steady, uniform feed from the raw surge pile; (2) a steady, continuous water feed; and (3) avoidance of overloading of the screens.

Material blending is initiated in the reclaiming tunnels underlying the coarse aggregate storage silos, and the sand stockpiles. Here the eight gradations can be recombined in a wide range of specifications. Drawpoints are fitted with clamshell gates, belt feeders (sand), or blending chutes (gravel). With two feeders under the sand stockpiles, draw can be made from alternate sides for moisture control.

Six sand and seven gravel blends can be established by an operator at a central control panel. Then by actuating only a master switch, these blends will be delivered as long as material remains over the feeders or gates in use. (A red "dry hole" signal flashes when a silo is empty or sand cannot reach its drawpoints.)

This blending system, preceded by uniform grading control throughout the plant, has proved an invaluable tool to the sales staff; and it has the flexibility to meet the demands of governmental agencies from the local to national level, as well as individual commercial customer requirements.

New Dredge Design Both operating and market factors were in the background of the development of a unit built and described by C. G. Cooley (president, Cooley Gravel Company, Denver, Colo.), in his talk entitled *A New Type of Dredge for Sand and Gravel Recovery.*

C. G. Cooley, Cooley Gravel Company . . . we became convinced, after considerable investigation, that we could pump large quantities of material with a jet alone. . .

By June, 1957, the Cooley operations had grown to the point at which three floating plants were producing from different sites in and around Denver. However, Mr. Cooley pointed out, a growing need for more coarse aggregates in the south Denver area further complicated existing pit problems. The latter involved an excess of sand, plus the fact that the sand was too coarse.

All factors indicated that production could be doubled in plant No. 3 if it could be fed a de-sanded pit-run material. This thinking led to preliminary design of a combination dredge and screening plant that would de-sand the deposit, and then replace the material in the pit with coarse sand on the bottom, finer sand in a middle layer, and plus ¼-in. gravel on top (above the water level). De-sanding of large areas would be followed by later recovery and processing into finished products by the existing floating plant.

Industry members from coast to coast could be found throughout the exhibit areas. From Wisconsin came Russell Frederickson, Hartland Sand & Gravel Company; and Ben Palmer, Palmer Crushing Company.

The early design contemplated a 16-in. dredge pump, Mr. Cooley said; but before proceeding with construction of the dredge, management undertook an inspection trip of several dredging operations. Considerable interest was aroused in Cooley personnel by jet-induced suction incorporated in some of the operations visited. Further study, including laboratory testing, convinced him, Mr. Cooley stated, that large quantities of material could be pumped with a jet alone, eliminating the conventional dredge pump.

Such a unit was then designed, built, and placed in operation in June of last year. It consists of the following: three main hull pontoons; two pontoons supporting a chain digger; a 56-ft. long chain-type cutter-digger with an annular jet nozzle; two 430-hp. (1,800 r.p.m.) diesel engines, each direct-connected with a 6,200-g.p.m. centrifugal pump (in series) for jet water; a diesel generator set; a trash separator; two rod deck vibrating screens; a 75-ft. stacker; a hoist; a spud and winch; and auxiliary equipment.

Average production since installa-

(Concluded on page 117)

Program, equipment show—lodestones for crushed stone operators at

43rd Annual Convention

Part I *

**For the benefit of our readers, our reporting of this convention has been separated into two parts. On the immediately following pages of Part I are the discussions of association business, and miscellaneous sections of the program. Starting on page 106, Part II carries detailed reports on a number of topics under the headings of operating safety, engineering, etc.*

ANOTHER ON THE SPOT REPORT

FOR attendance, program content, and the quality of the concurrent Manufacturers Exposition, the 43rd annual convention of the National Crushed Stone Association was probably unsurpassed in the group's history.

Held on February 22, 23, and 24 at the Conrad Hilton Hotel, Chicago, the three-day session included a comprehensive program of discussions on a variety of operating, product, and marketing problems which are of vital interest to all crushed stone producers. However, the schedule provided an equal amount of time for members to visit the equipment exposition and get the full benefit of the latter without missing any of the important convention sessions.

A large number of new developments were in evidence at the equipment exposition, in which 85 manufacturers had display space.

Preceding the general sessions, the boards of directors of N.C.S.A. and the Manufacturers Division met and elected their respective new officers. These were introduced during the greeting luncheon on opening day, and at the Manufacturers Division luncheon on the second day.

Presiding officers for the general sessions included: N.C.S.A. president W. C. Rowe (Rowe Contract-

New N.C.S.A. officers and board members include (seated, l. to r.): J. Reid Callanan (Callanan Road Improvement Co.), treasurer; Charles Coburn (Waukesha Lime & Stone Co.), vice-president; G. D. Lott Jr. (Palmetto Quarries Co.), president; W. C. Rowe (Rowe Contracting Co.), retiring president; G. D. Fraunfelder (Easton Car & Construction Co.), representing the Manufacturers Division; O. E. Benson (General Crushed Stone Co.). Standing: J. L. Holden (Genesee Stone Products Corp.); W. P. Foss (New York Trap Rock Corp.); D. L. Williams (Virginian Limestone Corp.); P. V. Corey (Blue Rock Quarry); D. C. Harper (Southwest Stone Co.); and M. E. McLean (East St. Louis Stone Co.).

# of N.C.S.A.

The Manufacturers Division elected these new officers (seated, l. to r.): C. D. Smith (Joy Manufacturing Co.), vice-chairman; George D. Fraunfelder (Easton Car & Construction Co.), chairman; W. E. Collins Jr. (Atlas Powder Co.), retiring chairman. Standing: J. R. Boyd (N.C.S.A. executive director), secretary; C. S. Weber (Thew Shovel Co.), executive committeeman; L. A. Eiben (Northern Blower Co.), executive committeeman; and L. A. Rhodes (Stedman Foundry & Machine Co., Inc.), executive committeeman.

ing Company), O. E. Benson (General Crushed Stone Company), Montagu Hankin Jr. (Houdaille Construction Materials, Inc.), J. F. Lane (association general counsel), K. K. Kinsey (Concrete Materials and Construction Division, American Marietta Co.), G. D. Lott Jr. (Palmetto Quarries Co.); and W. D. Milne (Kentucky Stone Co.). W. E. Collins Jr. (Atlas Powder Co.), chairman of the manufacturers division, presided over the division's luncheon.

Elections George D. Lott Jr. (Palmetto Quarries Co., Columbia, S. C.) is the new president of N.C.S.A. Charles Coburn (Waukesha Lime & Stone Co., Inc., Waukesha, Wis.) was elected vice-president. J. Reid Callanan (Callanan Road Improvement Co., South Bethlehem, N. Y.) was re-elected treas-

Below: At a meeting prior to the official convention schedule, the N.C.S.A. board of directors elected the new association officers.

R. H. Harrison, chief administrator, Region IV, Bureau of Public Roads . . . in 1960, 210,000,000 tons of aggregate will be required by the national highway program alone.

urer. J. R. Boyd and J. E. Gray continue as executive and engineering directors, respectively.

The new members of the executive committee are: D. C. Harper (Southwest Stone Co., Dallas, Tex.); J. L. Holden Genesee Stone Products Corp., Batavia, N. Y.); M. E. McLean (East St. Louis Stone Co., East St. Louis, Ill.); and W. D. Milne (Kentucky Stone Co., Louisville, Ky.).

New members of the board of directors are: C. A. Barinowski (Vulcan Materials Co., Birmingham, Ala.); J. S. Vandermade (Sowerbutt Quarries, Inc., Paterson, N.J.); and W. W. Weaver (Weaver Construction Co., Iowa Falls, Iowa.).

Coming Meetings The 1961 annual convention of the N.C.S.A. will be held at the Americana Hotel, Bal Harbour, Miami Beach, Fla., January 17 to 20. The 1962 annual convention and exposition will be held at the Conrad Hilton Hotel, Chicago, Ill., during the week of February 18. The 1960 midyear meeting of the N.C.S.A. board of directors will be held at The Greenbrier, White Sulphur Springs, W. Va., July 20 to 23. The Manufacturers Division executive committee will meet on July 20.

Manufacturers Division George D. Fraunfelder (Easton Car & Construction Co.) succeeds W. E. Collins Jr. (Atlas Powder Co.) as chairman of the Manufacturers Division of N.C.S.A. The new vice-chairman is C. D. Smith (Joy Manufacturing Co.). Elected to the executive committee were L. A. Rhodes (Stedman Foundry & Machine Co., Inc.); and C. S. Weber (Thew Shovel Co.). Messrs. Collins, Fraunfelder, and Smith will represent the division on the N.C.S.A. board.

At the division's directors' meeting on February 21, it was announced that there were 120 members.

Executives Session At the luncheon session for executives John F. Lane of Gall, Lane and Howe, general counsel of N.C.S.A., discussed federal laws and regulations of significant interest to crushed stone producers. With respect to percentage depletion, the Cannelton Sewer Pipe Company case is important with regard to the cut-off point; and the Supreme Court decision, which is not expected before May, will be a crucial one. The Iowa Limestone Company case is the most important crushed stone case, but the Treasury Department has better factual records on the Cannelton case and is depending on it.

The truck driver problem with respect to the Davis-Bacon Act is another serious one for producers, according to Mr. Lane. He advised them in making arrangements to be certain that on government contracts their truckers are not employees but are in the independent contractors category. The Fair Labor Standards Act, he said, will be changed considerably by legislation now being studied. The Landrum-Griffin Bill closed up loopholes in previous laws in the area of secondary boycotts.

Politics Is Your Business The need for the American businessman to take an active part in politics was forcefully pointed out by W. H. Baumer, special assistant to the president, Johnson & Johnson. Taxes are the biggest cost of business, and taxes are controlled by politicians. The best lobbyists or

Members of the Manufacturers Division board of directors at a pre-convention meeting.

Enter 103 on card, page 169 →

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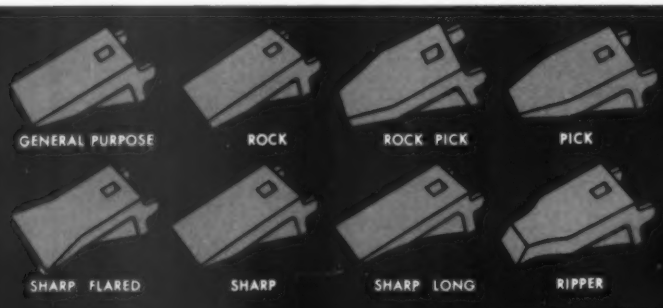

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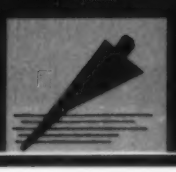

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The ladies' program included a tour to Chicago's famed Kungsholm restaurant, noted for its Scandinavian cuisine, and Miniature Grand Opera.

associations, he said, cannot win an issue if the local climate has not been developed favorably by the businessmen involved. In New Jersey, for example, there are only four businessmen—but more than that number of labor leaders—in the state legislature.

Most businessmen, said Mr. Baumer, are afraid to go into politics because they think it will hurt business. This his firm found to be untrue—it actually helped business. Some employers dislike having employees in politics but do not object to their activity in civic affairs, charities, etc. He pointed out that labor unions are constantly discussing and publicizing politics, and that labor leaders are active in it; therefore, companies should do the same. When a labor leader is elected to a political job, his union prestige goes up; and the same should be true of businessmen. There is a great need for business talent in all departments of our government, and greater participation on the part of businessmen could make a great difference to the future of this country.

Highways R. H. Harrison, chief administrator, Region IV Bureau of Public Roads, read a paper prepared by E. L. Armstrong, U. S. Public Roads Commissioner.

Crushed stone is a basic product, Mr. Armstrong stated, and our current road building program will call for mountains of aggregates. In 1960, he predicted that $4.25 billion will be spent and 210,000,000 tons of aggregate will be required by the national highway program alone. Local highway construction will require another 65,000,000 tons, making a total of 275,000,000 tons.

He also urged more prospecting for new sources of aggregates. The available supplies in Colorado, Ohio, and Mississippi are not adequate to supply the demand during the next 15 years.

(Continued on page 113)

Hostesses for the ladies' entertainment were Mrs. W. C. Rowe, Mrs. W. E. Collins Jr., and Mrs. M. E. McLean.

D. C. Harper, center, and J. W. Horovick, right (Southwest Stone Co., Dallas, Tex.), visiting the equipment exposition.

under any digging condition.

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43rd Annual N.C.S.A. Convention

Quarry, Plant, Front Office— All covered in N.C.S.A. Sessions

Part II *

**On the following pages our readers will find details on all topics discussed during the convention in the fields of engineering, operating, safety, etc. These topics run the gamut from blasting to research, and are grouped under appropriate main headings. We hope this arrangement will accomplish our goal of getting the reader quickly to the particular subjects in which he is primarily interested.*

Plant, Product Engineering

Engineering Director's Report The past year has been one of tangible developments, said Joe Gray, N.C.S.A. engineering director, in his report to the membership. A large, well-trained, and efficient staff has been a prime factor in the progress of both classifications of laboratory programs—service testing and research.

Service testing, or work on members' problems, has fallen into six general types, Mr. Gray said, and these are the predominating types of recurring problem upon which lab investigations have been made. Of particular interest are the investigations to develop means of overcoming excessive slipperiness of bituminous paving mixtures, in which trouble has been attributed to the characteristics of the aggregate used.

Durability of concrete, as affected by the coarse aggregate, is a commonly recurring problem. Comprehensive study has been given to this point because a true evaluation of an aggregate in terms of its performance in concrete is very difficult, it was emphasized.

Since it is questionable whether any soundness test on the aggregate itself is a dependable indication of its performance in concrete, the need for a more thorough investigation is obviously necessary when a member's stone has been rejected because of an arbitrary test.

Production of stone sand has aroused the interest of a growing number of operators, and a number of tests have been made on evaluating the quality of stone sand as a fine aggregate in portland cement concrete. While this usually involves tests for gradation, Mr. Gray noted, complete concrete tests sometimes have to be made to have a state consider the material for acceptance.

J. P. Datesman, C. & N. W. R. R., . . . ballasting practices and materials were critically reviewed.

D. B. Wendling, vice-president, sales, Consumers Co. Division, Vulcan Materials Co. . . . high volume at moderate unit cost was the answer to a problem.

W. J. Parton, vice-president, operations, General Crushed Stone Co. . . . "No one drill or drilling principle is best for all types of rock."

Panel members who discussed in-plant storage—E. L. Heidenreich, consulting engineer; R. T. Lassiter, Western-Knapp Engineering Co.; and R. C. Meissner, Meissner Engineers, Inc. Montagu Hankin Jr., was presiding officer.

A. J. DeMarchi, superintendent, Canada Crushed and Cut Stone Ltd. . . . "We were faced with the problem of welding or replacing (badly worn crusher concaves)."

Occasionally the laboratory staff is called upon to make certain tests of a member's material for compliance with a new or unique specification requirement. This has been done, for example, on an unusual shape of particle requirement. Currently a program of tests is under way on an alkali-aggregate reaction problem.

Variation in specifications for base course materials, and the large quantities of aggregates used in base course construction make this an attractive market. Therefore, Mr. Gray said, members often want to know if they can produce a material that complies with various specifications; they ask what the merits of their material are in comparison with competitive material of a different type. Such a request usually involves a rather complete program of tests to develop the desired information.

Some important accomplishments in the field of research made during the last year have actually been outgrowths of service testing. One of the most important relates to the alleged polishing of all limestone aggregates in bituminous mixture surfacing courses.

Recent tests made on such mixtures indicated that the limestone involved not only did not polish, but maintained exceedingly high non-skid surfaces throughout the tests. Further investigations have developed information with which it is believed possible to describe the characteristics of non-skid limestones —a major accomplishment since it underscores the fallacy of judging a material by its mineral name.

Another fallacy has been exposed through the service testing programs, Mr. Gray indicated. Normally, the failure of material samples to pass the usual sodium and magnesium sulfate soundness tests would represent the end of testing on these samples. However, further study was devoted to these cases. Tests involved incorporating these materials in air-entrained concrete, and subsequently testing the performance of the aggregate under the actions of freezing and thawing. Result—the aggregate performed exceedingly well.

In the area of research, Mr. Gray's staff made a co-operative study with B.P.R. and other laboratories on the cause of wide variations in Los Angeles abrasion tests on aggregate from the same source.

Lack of uniformity in drum rotation was found to be the main culprit, Mr. Gray stated. As a result, the co-operating laboratories, including N.C.S.A.'s, have corrected deficiencies in their equipment, and have attained test results of excellent reproducibility.

F. V. Reagel, Missouri State Highway Commission . . . are you helping to bear the cost of research?

Stone sand for masonry mortar was put through a series of tests. Results indicated, for the materials tested, that stone sand, when properly graded, will produce a mortar of good workability with a water content approaching that of mortar made with natural sand. Further, compressive strengths were greater and drying shrinkage less than in mortars made with natural sand.

A current research project mentioned by Mr. Gray is directed at determining the cause of softening of dense graded aggregate base courses. Other investigations have established that the basic property of the aggregate that causes the trouble is the characteristic of degrading into plastic fines.

While probably all aggregates degrade under load, no difficulty arises if the fines created are non-plastic. Thus, the current project has as one goal the determination of the characteristics of aggregates which may degrade and create plastic fines.

The subject of dense aggregate base courses (known as rolled rock base in the West) is the basis of a new promotional activity undertaken for the membership. A movie, in sound and color, has been produced to tell the story of how to build and inspect a dense graded aggregate base course in order to attain maximum performance.

This movie has received considerable acclaim from many engineers

Top honors in the safety contest were taken by the Clinton Point Quarry, New York Trap Rock Corp. To the right of the Explosives Engineer trophy is George White, superintendent, who is holding the N.C.S.A. trophy for the Group I winner. Another New York Trap Rock representative, John Jorgenson, superintendent of the Tomkins Cove Quarholding the N.C.S.A. plaque (also in Group I) won by the latter operation.

for its technology and information, and the association headquarters plans to make it available on a first-come-first-served basis to producers or any highway group interested.

The film, which had its premiere following Mr. Gray's report, stimulated considerable enthusiasm among the producers.

Design for High-Volume Production D. B. Wendling (vice - president, sales, Consumers Co. Division, Vulcan Materials Co., Chicago) reviewed the firm's new McCook, Ill., plant in a discussion on the *Latest in Plant Design for Large Volume Production*.

This installation, probably one of the most outstanding in the Middle West, was constructed as an answer to the serious problem of rising production costs and lack of capacity to handle available markets. A major factor was obsolescence of plant and equipment. High volume from a design that would substantially reduce unit cost was the solution sought.

Production from the original 50-year-old plant was maintained throughout the construction of its successor. This was a particularly interesting engineering project since the new plant was built on the same site, and "around" the older one.

Rated at 1,500 t.p.h.—but reportedly often exceeding that figure—the new operation represents an investment of approximately $6 million—ample evidence of the organization's determination to "keep up with the times."

First operations of two major phases—primary and secondary crushing—were undertaken 21 months after construction was started in March, 1957. Full operation was in effect by mid-1959.

Doubled capacity and virtually unlimited potential in product sizes are two impressive characteristics of the new operation, backed by equally impressive details of equipment and design. The primary crusher has been installed on the quarry floor—or rather, in an excavation 92 ft. below that level. Products of primary reduction are put through secondary crushing in an installation erected on the quarry floor.

Six tertiary crushers in the flow subsequent to the foregoing crushing and screening provide the high volume of wide product size ranges available.

Fourty-four screens—with a total of more than 3,500 sq. ft. of screening area—comprise the third major operating phase. Material in transit between the various phases, from quarry to loading bins, is transported by more than two miles of belt conveyor systems.

Other impressive statistics on the construction and operation of the new plant include the following: 43,000 tons of stone were excavated for the primary crusher installation; over 7,000 cu. yd. of concrete were required in construction; 2,265 tons of structural steel were used; and electric motors total over 4,400 hp.

Modern Ballasting Practice Many railroads are using inferior grades of track ballast simply because it is available along their rights of way, J. P. Dates-

Representatives of the 33 winning plants in the 1958 N.C.S.A. safety contest. There are now five groups in the contest, based on the following man-hours: I—200,001 and over, II—101,000 to 200,000, III—50,001 to 100,000, IV—30,001 to 50,000, and V—30,000 or less.

Left: Joe Gray, N.C.S.A. engineering director, and Dan Miller (Dubuque Stone Products Co., Dubuque, Iowa). Mr. Gray presented a comprehensive report of the association staff's engineering and research work, which is detailed in an accompanying discussion.

Right: Many of the ladies found the exposition of considerable interest. Seen here is Mrs. Casper and her husband, Russ (superintendent, St. Charles Quarry Co., St. Charles, Mo.).

man, process engineer, Chicago & North Western Railroad, told the Wednesday afternoon general session. In many cases, he said, it would be more economical for some railroads to abandon their quarries and purchase aggregates from other sources.

Mr. Datesman described how the C. & N.W. Railroad is using a skin-lifting technique to raise entire track sections and replacing inferior ballast with quartzite quarried in Spencer, N.D. He cited the cost of this operation as roughly $410 per track mile, and told how recently a 10-man crew reballasted 2,221 ft. of track in an ordinary working day.

Objective of this ballast replacement, he said, is to give a smoother ride. He told the producers in the audience that it is up to them to convince railroads that top-grade stone is necessary for railroad ballast.

Operating, Maintenance

Drilling An analytical review of *Blast Hole Drilling at Quarries of the General Crushed Stone Company* was presented by W. Julian Parton (vice-president operations, General Crushed Stone Co., Easton, Pa.), who also contributed to the success of the operating meeting last year.

The abc's of crushed stone operations were laid out by Mr. Parton in the observation that blast-hole diameter and spacing affects fragmentation, which has an effect on shovel loading performance and crusher capacity, and thus affects plant capacity.

In a nutshell—improved fragmentation equals higher capacity, with less secondary breakage and reduced crusher maintenance as corollary benefits. General Crushed Stone has made many changes in drilling equipment in recent years, Mr. Parton stated.

High-speed drills have replaced churns at all but two quarries, and units at the latter will be replaced by taking advantage of excess drilling capacity of the high-speed rigs through rotation scheduling.

A fleet of seven drills is employed —five older units which were converted to down-the-hole drills, and two more recently acquired DHD models, one of which is truck mounted. The latter has proved a particularly valuable addition due to ease of transport from quarry to quarry.

Along with concentration on DHD drills, with which greater efficiency and lower costs have been realized, the company is following a definite trend toward the use of smaller-diameter blast holes, Mr. Parton indicated.

Charts were shown illustrating the performance of several types of drills —including those of drilling contractors—in the firm's various quarries. These comparison tables were particularly informative in view of the fact that the company's deposits include quartzite, gabbro, and limestones of varying hardness.

The studies carried out by General Crushed Stone emphasized some known advantages: modern drills have reduced quarry operators' drilling costs; high drilling rates in many instances make possible the use of a drill at more than one operation, a situation in which portability is an important design feature; and depreciation cost, higher on modern equipment than the older models due to higher original cost, can be kept to a low unit value by full utilization of the modern rig's capacity.

General's experience in its own quarries is that their hardest deposits —basalt and gabbro—have been most economically and efficiently drilled with DHD equipment. The most abrasive formation, quartzite, was most efficiently drilled with a rotary unit. (When converted to DHD, it provided higher penetration rates at only slightly higher unit cost per ton of broken stone.)

Softer limestone formations, with low chert content, were drilled at higher penetration rates by using drag bits on rotary drills. However, bit design was not yet equal to sufficient bit life that would make this type practicable for hole sizes desired.

Buildup of Gyratory Concaves An interesting answer to a maintenance problem affecting a great number of producers was detailed by A. J. DeMarchi (superintendent, Canada Crushed and Cut Stone Ltd., Hamilton, Ont.) in discussing *Building up Concaves of Gyratory Crushers with Preformed Steel.*

When the concaves of the 42-in. crusher at the firm's Dundas, Ont., plant became badly worn, the problem was whether to weld or to replace. The latter posed an unfavorable time factor; so it was decided to

weld. In lieu of building up 100 percent with rod, the job was done with preformed bars.

In preparation for the project, ¾- by 2-in. nickel manganese bars were purchased in 20-ft. lengths. These were cut into 13-, 13¼-, and 13½-in. sections (slightly less than the width of the concave at the particular point of installation).

A simple method was devised to preform the bars to proper curvature. A template was fastened to the bottom bed of a hydraulic jack, which was then actuated against the bars.

For the next step, as stated by Mr. DeMarchi, "the greatest problem was to get the proper welding rod, in order that our bars would not drop out after a couple of weeks in operation. We chose the MacKay 118.

"The welding procedure was the same as for any manganese welding. We started at the center of each bar, then worked first in one direction then the other, thus preventing overheating and allowing for expansion. The bars were welded top and bottom only, and the ends were left free."

Bar thickness for such a job should be determined by the amount of wear, it was pointed out. Further, to eliminate an undesirable ledge on the top row of bars, this section should be filled in with weld, tapering upward to zero.

Costwise, this method was determined to be about one-third less expensive in amount of rod consumed, and approximately 50 percent less in labor charges.

At the company's Hagersville quarry, a somewhat similar operation was undertaken to correct a wear condition on a smooth-head crusher mantle. Concave wear took place circumferentially toward the bottom of the mantle.

Round manganese rods, in diameters of ¾, ⅜, and ½ in. were used for this repair, however. Once the mantle was pulled and laid on its side, the rods were positioned with those of larger diameter on the the area of deepest wear, and welded. The distance between rods was just sufficient to provide for a good head of weld under each rod.

As Mr. DeMarchi stated, although the above procedure is not advanced as the complete answer to worn concaves and mantles, it will certainly prolong their lives; and it has been effective in maintaining production until time was available for major repairs.

The PIT AND QUARRY booth also enjoyed a number of visitors. At left is A. L. Moody (superintendent, Chattanooga Rock Products Co., Division of Vulcan Materials Co., Chattanooga, Tenn.), who is receiving from our president, William A. Wilson, one of the Polaroid cameras which were top prizes in daily drawings.

In-Plant Storage Various aspects of this phase of crushed stone operations were discussed by a panel comprised of R. T. Lassiter (New York district manager, Western-Knapp Engineering Co.), E. L. Heidenreich Jr. (consulting engineer, Newburgh, N.Y.), and R. C. Meissner (vice-president, Meissner Engineers, Inc., Chicago).

Commenting on provision of a surge pile following the primary crusher, Mr. Heidenreich noted that this practice is now standard with new plants, and also is being incorporated in older operations. While the latter have operated successfully without a surge of this type, there was a lack of uniformity in subsequent flow.

"Feast or famine" conditions were common in the screening stages without a surge pile; moreover, there could be no independence of operation for either the quarry or the plant. Putting in a surge can raise a plant's capacity by 10 to 15 percent, Mr. Heidenreich observed.

In answer to a query as to how small a plant should incorporate a primary crusher-run surge, it was suggested that the lower level would be about 200 t.p.h.

Mr. Lassiter, in discussing location of a surge after the secondary crusher, indicated that plant site topography may dictate this position. In addition, the existence of a large primary crusher, and consequent larger sizes of crusher run would almost make it mandatory that this material be put through secondary reduction before being placed on a surge for a screening plant.

Advantages are similar for both systems from that point on, and ground space required for either is about the same. One disadvantage mentioned is that two stages of crushing and contingent costs have been incurred on a volume of material, part of which will be subsequently discarded in the form of dirt or fines.

An advantage in many cases, is that the major crushing steps can be combined in one area; and this area, with attendant dust conditions, can be isolated from the rest of the operation.

In considering the size of surge that would be most beneficial, Mr. Meissner noted that surge capacity should relate primarily to plant capacity, but length of possible breakdowns in stages preceding the surge can also be a factor. Sufficient material in surge to accommodate ½ to 1 day of plant operation would generally be adequate, he said. However, some operators may want the equivalent of a full week-end supply.

The question of fines in the quarry-run material was also commented upon by Mr. Heidenreich, who emphasized that these should be removed as soon as possible following primary reduction, and certainly before the crusher run is placed on a surge pile. Most benefit would be derived from scalping ahead of the primary crusher. Otherwise they would have to be scalped ahead of the secondary crusher, and the resultant feed to the latter would be variable.

Drawpoint chute openings are also an important consideration, it was pointed out; and, according to Mr. Meissner, there should be more than one opening under a surge pile to help prevent and break up arching. In Mr. Heidenreich's experience, vibrating feeders seem to be the most effective units with which to draw from an overlying surge, but the

drawpoint chutes should be so designed as to eliminate a direct vertical load of stone on the feeder. Provision of a flow box will also prevent a straight drop of stone from a feeder onto a belt.

Surge reclaiming tunnels, Mr. Meissner added, should be large enough to allow good housekeeping and ease of maintenance, and to provide safe clearance for the men. They should also be well drained. For short tunnels, concrete construction may be expensive; and prefabricated metal sections may be preferable. However, caution must be observed in backfilling metal tunnels during construction, it was emphasized.

James R. Thompson and Russ Murphy (Blanton Stone Co., Frankfort, Ky.), find the exposition much to their liking.

P. E. Heim and L. M. Nauss (Carbon Limestone Co., Lowellville, Ohio) try their luck by registering for the daily drawing at the PIT AND QUARRY booth. Each day's top winner received a Polaroid camera.

Control of Air-Blast Effect It has been known for some years that in typical open-pit or quarry operations, the problem of damage from air blast is insignificant. J. R. Kringel (vice president—production, New York Trap Rock Corporation) told of a simple method of using this known fact to reduce materially the number of complaints received. This procedure was described in his paper, *Control of Air Blast Effect Resulting from Blasting Operations*. A movie, *Visual Perception,* was first shown to prove the unreliability of a person's five senses. Sight, usually the most reliable, was shown to be easily in error. Seeing involves the nervous system and the brain, and tests prove that what we *see* is always influenced by what we *think*.

Many quarry operators have become too sure that damage claims seldom have factual justification, and too dependent on technology and tangibles. According to Mr. Kringel:

"Zoning is no longer a simple government function concerned with the appropriate use of lands. It has become an all-encompassing remedy for the real and fancied troubles and annoyances of the citizenry, troubles ranging from fur-bearing animals to blasting.

"I suggest we tackle this complaint problem on the rather simple assumption that we are dealing not altogether with technology and tangibles, but rather with people, annoyed people, people who can and may punish us for that they believe to be our wrongdoings. . . . These people vote, they participate in government, they influence legislation, and they can punish you whether you are guilty or not."

In his company's experience, Mr. Kringel pointed out, most of the zoning testimony was based on blasting. In about 1,000 seismic tests made, there has been no correlation between the seismic energy ratio and the number of complaints received. When identical blasts were made some time apart, one would get many complaints; the other none. This led to the conclusion that if the air blast and noise were absent, few would object to the ground vibration. Efforts were therefore made to control air blast and noise. As a result, with 130 primary blasts in 1959, compared to 105 in 1958, there were only 39 complaints, compared to 123 in 1958, *a reduction of 77 percent*.

This was done by keeping the powder factor to the minimum and designing for each hole instead of the entire blast, thus eliminating excess energy, which would go out as sound. The new low-energy blasting cord is also less noisy; and covering it with screenings was a further help.

The important factor, however, was found to be the weather. Seismological records showed no correlation between low overcast and complaints, but Mr. Kringel said that several conditions of the upper atmosphere did have some effect. It was found that on days when many complaints were received there were either isotherms or temperature inversions within 5,000 ft. of the ground.

Complaints were greatly reduced by avoiding such days. Wind shear was also found to be an important factor. All these atmospheric conditions can be predicted far enough ahead even for large shots. Mr. Kringel's company uses a private weather predicting service, and if a good report is received one afternoon, the shot is loaded and made the next morning. Sometimes conditions change, and a shot is held up until they improve. Blasts are now being made successfully under conditions which were once taboo—in fog, rain, etc.; if the upper atmosphere is favorable, the shot is made.

This is a psychological problem, according to Mr. Kringel, and it is impossible not to *confuse air blast and vibration*. Air blast is not a real danger. It shakes windows, but not the houses; but to the individual, the effect seems the same.

Blast Vibration Damage *The Bureau of Mines Program for the Investigation of Damage Caused by Ground and Air-Borne Vibrations from Quarry Blasting* was outlined by Dr. Leonard Obert, chief, Applied Physics Laboratory, U. S. Bureau of Mines. The quarrying industry and other users of explosives have always been plagued by a variety of complaints directly attributable to seismic effects from blasting.

Many of these complaints, he said, are not valid but they are sufficiently numerous to constitute a real problem. The Bureau of Mines in 1930 began a research project which was supported by N.C.S.A. and its

members; and in 1942 its Bulletin 442 was published. This has for many years been an authoritative source of information in this field, but explosives developments, blasting techniques, and seismic equipment have improved so greatly that a revision is necessary.

Stepped up research undertaken by the Bureau, with the assistance of N.C.S.A., other associations, and industry, is directed at revising this bulletin. Many questions still remain unanswered, and it is important that reliable information regarding blasting vibrations be supplied the states, so that their codes do not become unnecessarily restrictive.

A conference was held in May, 1959, which was attended by quarry operators, seismologists, Bureau representatives, etc. All were given an opportunity to discuss their separate problems and interests, so that a comprehensive research program which would encompass all such areas could be developed. As a result, a 5-year research program with two major objectives was set up. These objectives are (1) to develop a propagation law for ground-borne surface vibrations, and (2) to establish damage criteria for various types of structures.

The principal independent variables in establishing such a law are the size of the explosive charge and the charge-to-measurement-point distance. The dependent variable is either the displacement, particle velocity, or acceleration. According to Dr. Obert, a wide variety of closely-controlled tests will be made which will cover the entire range of conditions found in quarrying and other blasting.

Secondary variables will also be investigated, including millisecond delays, types of explosive, and the effects of various types and depths of overburden. Limited investigations will also be made of directional effects. These tests will be made at several quarries in different parts of the country, so that a wide variety of conditions will be covered.

Air pressure measurements will be made for most shots in order to ascertain the magnitude of overpressures under known conditions. There will be no studies of the effects of anomalous atmospheric conditions, on which adequate information is said to be already available.

Establishing damage criteria for various types of structures, said Dr. Obert, is a more difficult problem, because of the wide range of structural variables. Particular attention will be given to the relationship between the magnitude of the vibration at the site of the structure and that produced in various parts of the structure. In addition, other damage data will be obtained from quarry and mine records, insurance company files, and investigation of complaints.

The necessary instruments have already been purchased, and a completely mobile trailer laboratory has been built and tested. This has a 36-channel system, including a direct-writing oscillograph, amplifiers, gauges, and accessory gear. Self-powered recording seismographs and accelerometers will also be used.

This investigation is a co-operative effort by the Bureau of Mines and industry, and the response on the part of the latter has been excellent. Dr. Obert emphasized that the complete success of this research will depend upon the continued co-operation of quarry operators in making test sites available and in permitting controlled experiments to be performed at these sites.

Road Material Research

Evaluating Aggregate Quality F. V. Reagel, engineer of materials, Missouri State Highway Commission, outlined the research his department has undertaken in evaluating quality requirements for aggregates. The trend toward a reduction of maximum size aggregates, he said, will help eliminate weak planes inherent in some larger aggregates.

Better grades of aggregate should be saved for heavy-duty use, and poorer grades should be used for sub-surface grading only.

In many cases the introduction of deleterious matter has lowered the quality of the aggregate, and methods of placing and removing aggregates from stockpiles should be studied. When aggregate is stored at the job site, crawler equipment causes contamination.

During the next few years, he said, the volume of aggregate required for base and shoulders will be greater than that for pavement sections.

There has been some misconception about committees and research, according to Mr. Reagel. All that committees can do is to criticize, review, and agree—but they cannot do any research, he declared. A lack of competent research personnel is slowing down the Missouri aggregate studies, he said. Although there is $800,000 available for research, the lack of competent personnel is slowing down the state's program. In this program the following items will be studied: suggested classifications for a supply of aggregates for concrete paving; a generalized attack on checking the suitability of coarse aggregates; an examination of existing concrete structures to ascertain the nature and degree of deterioration; and the economics of beneficiation.

Mr. Reagel closed his talk by asking whether the various members of the association are helping to bear the cost of research needed to produce better aggregate.

Safety Programs

The interest and concern with safety on the part of the industry's progressive producers finds proportionate recognition in the association's annual meetings. A review of the industry's record and presentation of awards for outstanding effort are always given a place of prominence in the convention program.

Again in this session, the award-winning producers were presented with their trophies before a "packed house" at the greeting luncheon on opening day; and the presentations were followed by the featured speaker—an expert on safety—Paul Jones, director of public information, National Safety Council.

Safety Awards Three types of awards are now available to association members in the annual safety contest. N.C.S.A. plaques have been created for five groups,

ranging from plus 200,000 man-hours, to 30,000 man-hours or less. In addition, the employees of the winning plants receive N.C.S.A. safety certificates. The third award is the *Explosives Engineer* Magazine plaque for the plant having operated the greatest number of consecutive days since the last disabling work injury.

Top honors for 1958, and the above-mentioned plaque, were taken by the Group I winner (200,001 man-hours and over), Clinton Point Quarry, New York Trap Rock Corporation, of which G. W. White is superintendent.

The N.C.S.A. plaque for Group II was won by the North Branford No. 7 Quarry, New Haven Trap Rock Company, R. D. Brewer, superintendent; the Group III winner was the Woodleaf Quarry, Superior Stone Co., H. C. Burgess, superintendent; the Group IV, Hickory Quarry, Superior Stone Co., John Long, superintendent; and Group V, White Haven Quarry, General Crushed Stone Co., Burr Shaver, superintendent.

All awards—to the 33 winners—were presented by H. H. Kirwin, Eastern Rock Products, chairman of the N.C.S.A. accident-prevention committee.

What's the Use? This provocative title for a talk was used by a man who pulls no punches in attacking the apparent complacency of the general public toward accident-prevention.

Mr. Jones of the National Safety Council had the eye-opening figures to back him up when he stated that accidents cost the American more than three times as much as foreign aid.

"But we kick up a king-size commotion over foreign aid and maintain a remarkable calm toward accidents," he asserted. (The figures show $3.5 billion budgeted for foreign aid and military assistance, and a $12 billion national loss in wages, medical and hospital bills, property damage, and insurance.)

"As a businessman perhaps you have been able to devise ways of saving a dollar here and there in your company budget," he said, "but have you taken the trouble to find out how much off-the-job accidents to your employees are costing your company in time and money?"

We don't know how to sell safety, he emphasized. It's cloaked in semantics, statistics, dignity, and what-have you—and it should be sold as common sense.

War is a piker compared to accidents for sheer killing. Twice as many Americans have died on the highway since the turn of the century than in all the wars the United States has ever fought. Greed, contempt, thoughtlessness, etc., are all causes of war—and of accidents.

One of the biggest obstacles facing accident prevention is that too often it is expected "for free," and it just can't be free, Mr. Jones pointed out. Industry has been aware of the fact for some time, he said, that accident prevention costs money, but it is only a fraction of the cost of accidents. As a result, "a worker is twice as safe on the job today as he is off the job."

N.C.S.A. Convention—Part I

(Continued from page 105)

Social Activities In addition to the greeting luncheon, the social program included a general luncheon which featured another outstanding speaker, Dr. Nicholas Nyaradi. As a former minister of finance in the Hungarian Cabinet, which involved months of negotiating a Russian "reparation" claim against Hungary, Dr. Nyaradi's exposure to the Russian attitude and objectives made him eminently qualified to discuss free world relationships with the Soviet.

Russians recognize only the iron fist, the speaker emphasized. Unfortunately, he added, our foreign policy is based on the good will of one man—Khrushchev—and the latter's attitude is readily subject to change. Mr. Khrushchev has already warned us (last year in Los Angeles) what to expect, Dr. Nyaradi noted; *i.e.*, coexistence with Russia on her terms, or nuclear war.

A danger equal to possible aggression, the speaker said, is "election year U.S.A.," during which the voters will be preoccupied with political promises of many things for nothing. We will look for fewer taxes, but more handouts, he said.

This galloping socialism is on the way to eliminating free enterprise, he cautioned, adding that free enterprise is a guarantee against Communism.

The association's 43rd annual meeting was brought to a close with a highly entertaining "Variety Night." This dinner dance was accompanied by outstanding entertainment.

A special program for the ladies included luncheon and entertainment at Chicago's famed Kungsholm restaurant, in addition to the convention events. Hostesses on this occasion were Mrs. W. C. Rowe, Mrs. W. E. Collins Jr., and Mrs. M. E. McLean.

Victor Chemical Adds Kiln At Mt. Pleasant Operation

Spokesmen for Victor Chemical Works, Mt. Pleasant, Tenn., report that Meissner Engineers, Inc., of Chicago has been retained to design the raw-materials-handling and feed system for a new kiln to produce nodulized phosphate rock. Included in the project are the new kiln, the cooling, crushing, and screening facilities, the scrubbing tower, the dust collection system, and the clarifying tank.

This facility is to augment the two existing kilns at the Mt. Pleasant plant. Foster-Creighton Co., are the contractors.

The Union Government (India) recently announced the acceptance of the recommendations of the Central Wage Board for the Cement industry, fixing a minimum wage of R$_s$ 94. (Current exchange rate of a rupee is 21.06 American cents.) according to the New Delhi *Hindustan Times*.

Asbestos shipments from Canadian mines increased by 19.8 percent to 65,581 tons in January from the 54,703 tons shipped in January, 1959, according to the Dominion Bureau of Statistics, Ottawa.

Canada Crushed and Cut Stone, Ltd., Hamilton, Ont., reported a net profit of $343,936 for 1959—13.7 percent lower than the corresponding figure in 1958. A favorable outlook for the crushed stone division in 1960 is expected to offset depressed prices in the cut stone division.

Lining a 16-ft. 6-in. Diameter Kiln Presents Many Unique Problems

Close Tolerances Require Special Manufacturing and Installation Techniques

By **HARRY M. STOVER**
Manager, A. P. Green Services, Inc.
Mexico, Mo.

ANOTHER P&D EXCLUSIVE

DESIGNED to produce 5,000,000 bbl. of cement annually, the new Dundee Cement Company plant has some of the largest rotary kiln equipment ever built. This especially large equipment was specified by the Engineering Department of the St. Lawrence Cement Company, which designed and engineered this entirely new plant.

Two rotary kilns, each 16 ft. 6 in., 15 ft., and 16 ft. 6 in. in diameter, and 460 ft. long, with clinker coolers and firing hoods of corresponding size, presented many new and unique problems in the production of refractory materials and their installation.

Special manufacturing techniques and quality control procedures were employed in manufacturing the kiln liners due to the extremely close tolerances required. These kilns required linings of various qualities of refractory materials. Five grades of kiln liners and three types of castable and mortar, were used, all selected according to their physical and chemical properties to withstand the variable conditions throughout the 460 ft. kilns.

For the installation of the kiln liners, new methods, equipment, and techniques were called upon. Material handling alone involved the transporting of over 4 million lb. (70 carloads) of material from the railroad siding to the storage area and then into the kilns. All materials were palletized and handled with fork lift-trucks. Ramps were built into each kiln, and the liners were brought directly to the masons by use of the fork lift-trucks.

Rotary Kilns Beginning at the feed end of each kiln, the 85-ft. chain section is lined with 6 in. of high-strength, abrasion-resistant refractory castable, anchored to the kiln shell with V type anchors. Placement of the castable lining was accomplished by pouring a 45-degree section the full length of the chain section. The castable was allowed to set and air-dry for approximately 12 hours before the kiln was rotated for the next pour. This procedure minimized slumping of the pour, and allowed the installation crew to compact the material properly around the anchor and steel spiral blocks. Mixing of the castable was done inside the kiln at the pouring area, with a paddle-type mixer, to minimize handling of the wet material.

On the recommendation of the A. P. Green Company, preference was given to a castable material over brick for lining the chain section because it provides a solid monolithic lining that is securely anchored in place and will render longer trouble-free service. Photograph No. 1 shows a closeup of the castable lining in the chain section, with the chain brackets in place.

Because of the extremely large diameter of these kilns, the brick contractor decided that the best kiln lining could be obtained by using the ring method of installing the liners. There were two reasons for this decision:

1. Greater tightness of the lining, which was extremely important due to the small amount of taper on the liners (40 percent less than on liners for a 12-ft. diameter kiln). The necessity of a tight lining was further emphasized by the fact that the liners were laid dry, and brick-to-brick contact was very essential.

2. Greater safety during construction of the lining over the conventional jacking method.

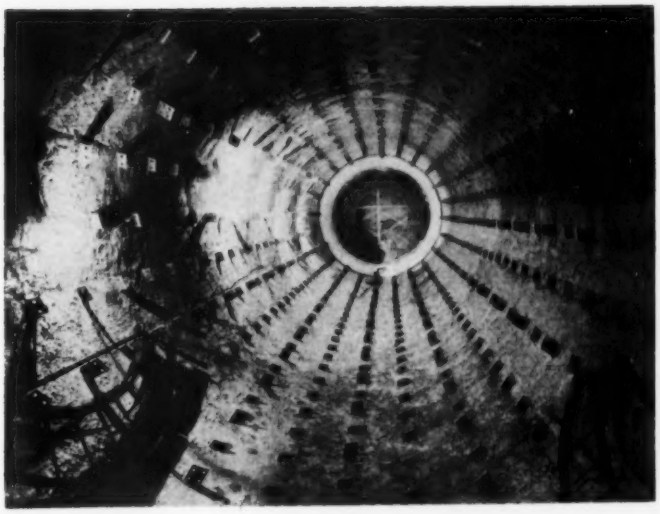
The brick lining was installed beginning at a retaining or thrust ring, of which there were eight per kiln. Prior to laying of the brick, each kiln was first loaded with enough liners of the proper quality and size to install the bottom half of the lining. A working space of approximately 10 ft. was left between the point where the work started and the place where the refractory material was stored. This system utilized the minimum of manpower and resulted in very little material damage.

Photograph No. 2 shows the bottom section of the lining, installed up to the horizontal center line of the kiln. This photograph also shows the foundation courses for one of the four dam sections. Note that ⅓ bond construction was used, to facilitate the laying of the liners and provide tighter joints. After the bottom half of the lining was in place, a specially designed rig was used to install the top section of the liners.

Photograph No. 3 shows the rig which was designed by the brick contractor expressly for this job. In laying up the liners with this circular expandable rig, the liners were inserted between the kiln shell and the circular feet of the rig, starting at the horizontal mid-point of the kiln. The rig was so constructed that as the liners were placed in position, a radial force was exerted that held the

Photo #1
Right: A closeup of the castable lining in the chain section, with the chain brackets in place.

Photo #2
Middle: The bottom section of the lining, installed up to the horizontal center line of the kiln.



liners against the kiln shell (see Photo No. 4).

The above procedure was continued up and around the top part of the circle until a 5- to 9-in. space was left for the key brick. No key brick less than one-half the size of a full liner was used—even if it required cutting two key liners. After the key point was reached, a hydraulic foot jack—shown in photograph No. 3—was inserted in the key space, and the entire ring of liners was tightened. The key space was then accurately measured and filled with a refractory shape cut from a good sound liner. Next, the key brick was driven approximately 1¼ in. into the key cavity, with the jack still in place. At this point the jack was removed, and the key brick was driven the final distance. If a key brick broke while being driven, it was removed, and a new one was installed. After each section of liners was installed, the kiln was rotated, in order to stagger the key brick.

In laying up the lining in the tapered or transition sections, a different type of rig was used. This device consisted of a circular channel with special screws spaced on approximately 8-in. centers around the circumference of the channel. Photo No. 5 shows this rig. With this type of rig, each liner was set in place by tightening the screws that were spaced on the rig to support each brick. With this same device the dam sections were installed. The working diameter of the rig was adjusted to

Photo #3
This rig was designed by the brick contractor especially for this lining project at Dundee.

Photo #4

The rig was so constructed that as the liners were placed in position, it exerted a radial force to hold the liners against the kiln shell.

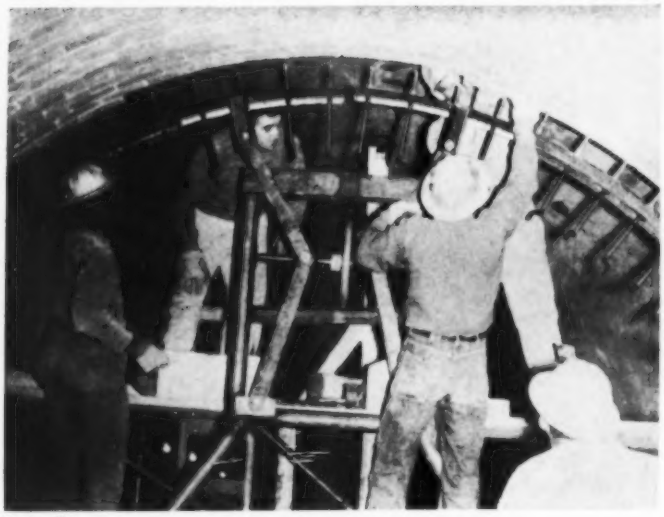


Photo #5

Another type of rig was employed in lining the tapered sections. It consisted of a circular channel with special screws spaced on 8-in. centers around the circumference of the channel.

accommodate the varying diameters of the dam section.

Photograph No. 6 shows the discharge end of the kiln, which is a 16-ft. 6-in. O.D. dam section lined with 18 in. of 70 percent alumina liners and special nose blocks for the last course. The black area is the 9-in. basic lining.

After the kiln lining was completed, all of the fire-clay liners were grouted with high-temperature bonding mortar, to provide joint protection.

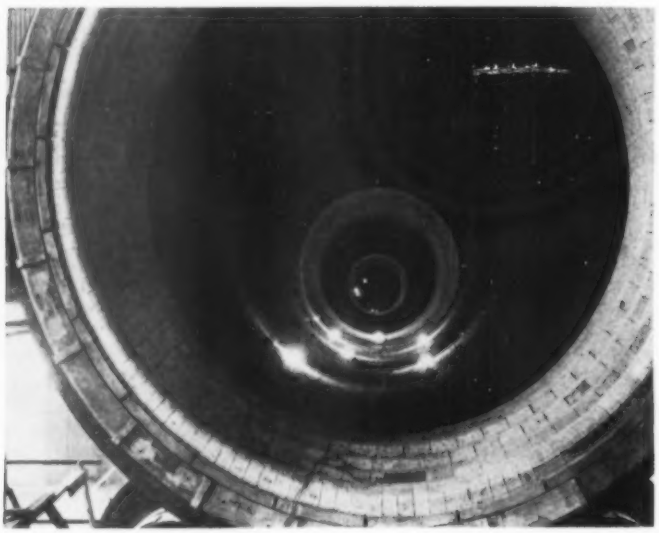
Firing Hoods These units, because of their size, shape, and operating conditions, demanded the ultimate in refractory materials, construction features, and installation techniques. The proper provision for kiln contours, firing equipment, access and observation openings, and hot gas ducts necessitated a rather complicated refractory design, which dictated the choice of a special super plastic refractory lining.

Photograph No. 7 shows one of the finished hood linings, and indicates the relative size of these units. The monolithic lining affords excellent resistance to the abrasion and thermal spalling, high temperature conditions that are common in firing hoods. The 9-in. plastic lining, backed up with 1 in. of block insulation, is securely anchored to the outer steel casing with refractory and alloy anchors designed to allow freedom of movement to the lining as it expands and contracts. This type of lining will not bulge and fall out due to dust penetration. (This is the usual experience with the conventional brick construction.)

Proper installation of this type of lining is extremely important. Pneumatic rammers weighing approximately 12 lb. were used to ram the plastic material in place. No forming was required in the straight, vertical walls. However, the circular sections were formed in such a manner as to facilitate the ramming. The finished surface of the lining was

Photo #6

The discharge end of the kiln—16 ft. 6 in. O.D.—lined with 18 in. of 70 percent alumina liners and special nose blocks for the last course. The black area is the 9-in. basic lining.



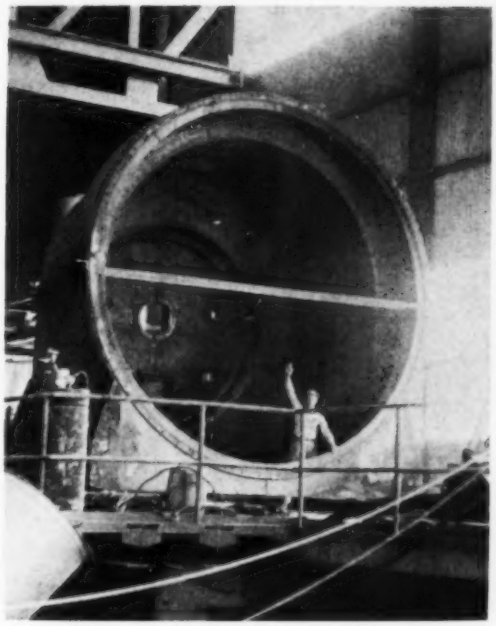


Photo #7
This view of one of the finished hood linings shows the large dimensions of the kiln.

trimmed and scraped to provide a porous surface that would allow moisture to escape during the firing-in period.

Clinker Coolers The refractory materials and type of construction used in lining the two 10- by 68-ft. coolers were also specified because of their ability to render longer trouble-free service. Monolithic construction was employed, as in the lining of the two hoods.

The kiln end or throat section of the cooler was lined with 13½-in. wall construction consisting of 9 in. of super-duty plastic refractory, backed up with 4½ in. of firebrick. The remainder of the cooler lining was constructed of 7 in. of high-temperature castable refractory, backed up with 2 in. of high-temperature block insulation, except at the discharge section of the unit; there the wall thickness was 7 in. of solid castable.

This castable lining was poured in three lifts of approximately 4 ft., with conventional plywood forms, and anchored to the steel casing with special V type anchors. Castable refractory material was also utilized in the flat suspended cooler roof, which was 7 in. thick and supported with special V type anchors. The roof was poured in 4-by 8-ft. panels to control expansion and contraction stresses, and also to facilitate repairs.

All refractory materials were supplied and installed by the Installation Service Division of the A. P. Green Fire Brick Company.

N.S.G.A.—Part II

(Concluded from page 99)

tion of the complete unit has been about 750 t.p.h. Mr. Cooley said. A serious problem encountered during early operations involved wear on the jet proper. Several types of liners were used, but they proved to be inadequate. Currently the alloy liner being used—very similar to Ni-hard—shows considerable promise.

The new unit is considered a practical success, but due to the characteristics of the deposit, there is still the problem of recovering minus 100-mesh sand. Experiments are being conducted with a cyclone having a low entrance head of about 9 ft., and it is hoped that eventually the dredge production will reach 1,000 t.p.h.

The greatest advantage in jet-induced suction with a dredge pump, Mr. Cooley said, is an increase in the percent of solids, and elimination of cavitation.

Finish Screening The need for careful handling of properly graded aggregates to avoid contamination, and the possibility of specifications calling for finish screening in batching plants was emphasized by Stanton Walker, director of engineering, N.S.G.A. and N.R.M.C.A., in his talk entitled *An Examination of 'Finish Screening.'*

"I have no fear that finish screening will become a common practice in the ready-mix industry if carefully graded aggregates are handled properly," Mr. Walker said. "But, unless adequate grading controls are enforced, finish screening specifications will be imposed upon the industry." Consideration of finish screening as a requirement for adequate grading control is completely inconsistent with the construction of plants described in the associations' annual meetings. These plants are designed to furnish controlled gradings with far greater accuracy than can be accomplished with single "finish screens" on top of ready-mix batching bins.

In his description of a good average screening plant that would meet A.C.I. grading requirements, Mr. Walker said he felt that significant changes in screening practice would be needed. Further, it might be necessary to make a cut using two screens instead of one, with the attendant problem of recirculating the middlings. But if justified, it could be done.

Mr. Walker made it clear that, except under special circumstances, he did not consider finish screening an economical or efficient method of obtaining needed grading control of aggregates as they go into bins at the batching plant. In many locations, the conversion of a batching plant to a combination screening plant would be impracticable for many reasons. Sufficient ground area or head room may not be available, and vibration could possibly violate many zoning ordinances.

In closing, Mr. Walker warned the group that members of the industry may be confronted with pressures to do "finish screening", and urged that they should equip themselves to demonstrate their ability to control gradings without it.

AN INDUSTRY LEADER SPURS PRODUCTION TECHNOLOGY

New Houston Operation First Ideal Plant To Benefit From Instrumentation Experiments

By BUREN C. HEROD

OVER the years the trend in the cement industry has been towards more and more instrumentation. One of the country's leading exponents of instrumentation and centralized process control is Ideal Cement Company whose engineers have been working in this direction for the last five years.

Ample evidence of their success is found in three outstanding phases of Ideal's current expansion program —the new plants at Houston, Tex., Ada, Okla., and Tijeras, N. Mex. (See also PIT AND QUARRY, September, 1959, pp. 84-87.) These new operations are major factors in the project, which will result in a total annual capacity of 40,000,000 bbl. in the target year 1965.

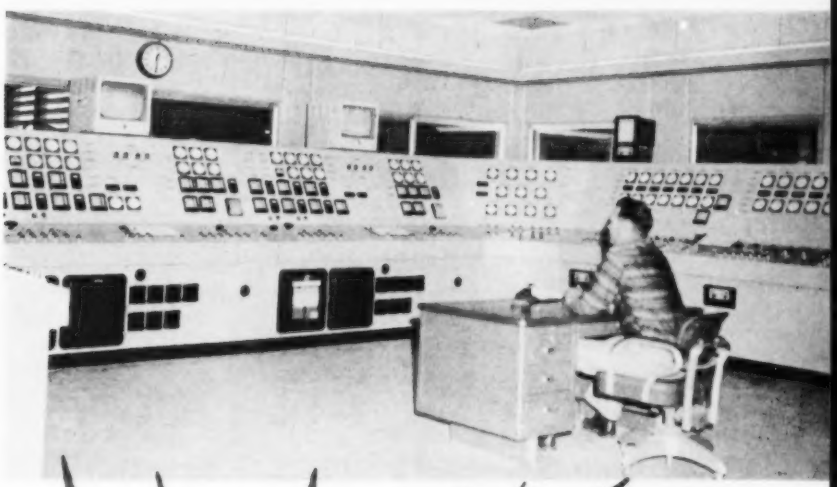
The new Houston plant was the first of the above three to go into full operation, and began production of clinker two years ago. It represents Ideal's first full-scale application of process control. It is rated at 3,000,000 bbl.

Basically, the concept of centralized control was to permit the operation from one location of all the equipment associated with a cement plant. With such an arrangement it became necessary to provide the operator with the same or equivalent information that he would have if he were stationed at the machine or piece of equipment. In addition to the information transmitted to the control room concerning the actual operation of the equipment, it also became necessary to furnish the operator with information regarding the process. With all information concerning the process transmitted to one location, better control and supervision made possible more efficient production and a more uniform product.

Since a kiln is the heart of cement production, it was natural that the industry over the years should develop a certain degree of instrumentation for that phase. Until recently, however, the instruments involved were essentially for indicating and recording. In striving for process control, Ideal's engineers took the further step of putting the indicating or recording units to work with devices for control of variables. Thus, in addition to measuring, indicating, and recording, the instrumented system would control, regulate, and furnish warning should variables cross the desired limits.

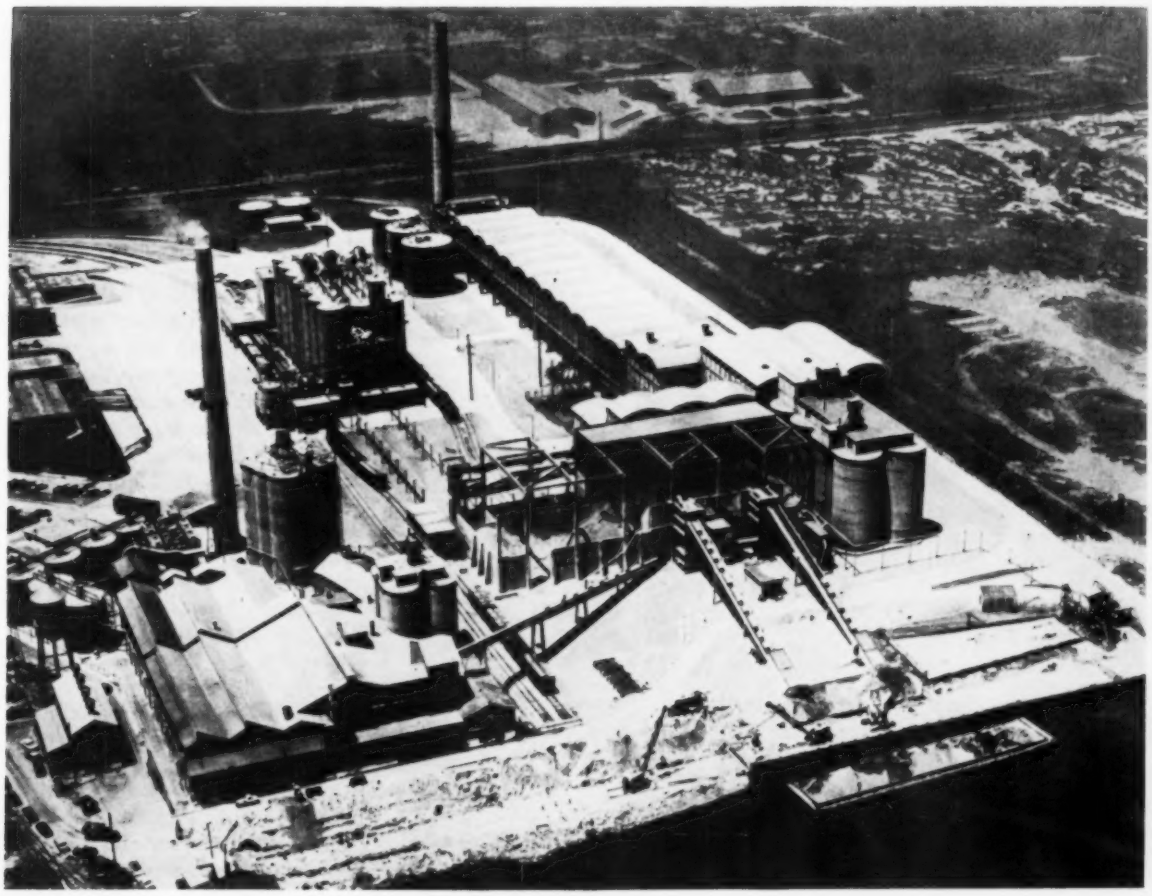
Control Room Housing of instruments and controls is probably the most interesting innovation at the new Houston plant. The entire process, including raw grind,

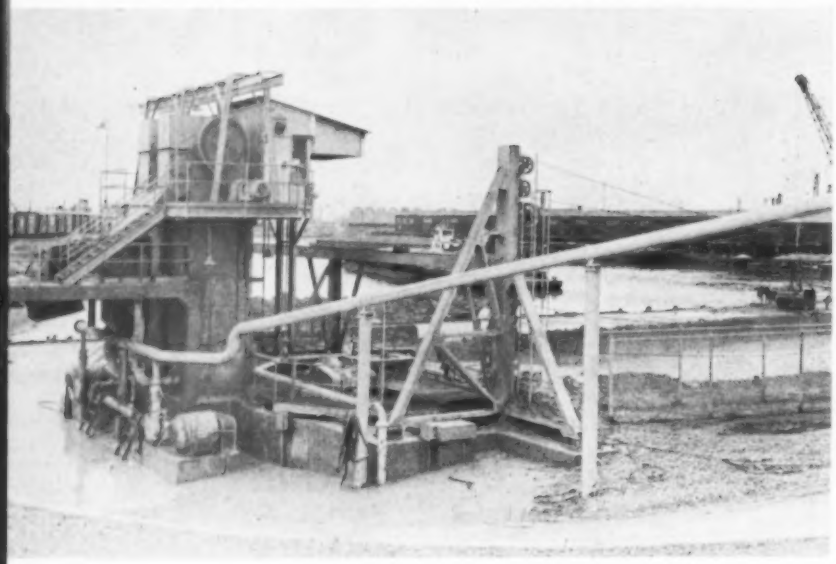
Left:
RAW MATERIALS. A 750-ft. dock was built to handle incoming barges of shell and clay. The shell is discharged into hoppers for the two conveyors, and the clay into the soaking pit, lower left center.

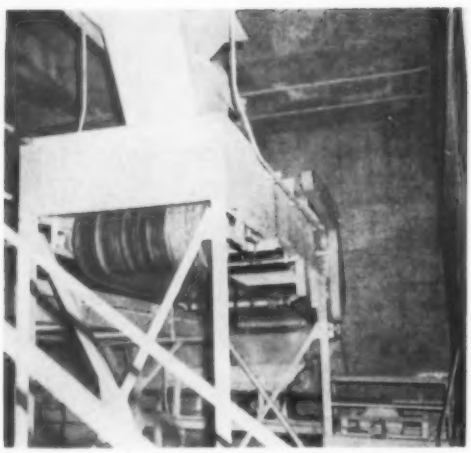


Right:
CENTRAL CONSOLE—the heart of the control system. Every phase, except raw material unloading and packhouse loading, is regulated from panels on this console.

Below:
AN AERIAL VIEW. Ideal's new Houston plant represents the company's first full-scale application of centralized process control. At the left in this aerial view is the companion (but separate) older mill. Raw materials for both are handled by the same dock-side system and raw material storage.



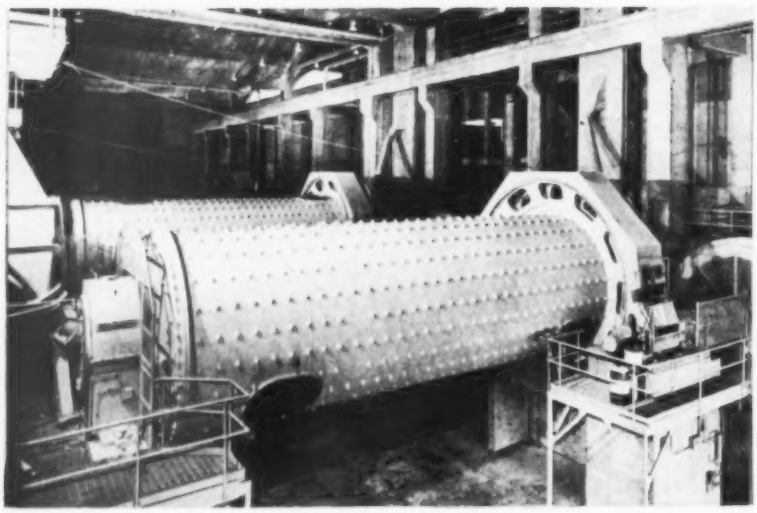




Above:
WASH MILLS—the two 24-ft. diameter clay wash mills. Slip is transferred to tanks in the mill buildings of both new and older operations.

Left:
CONTROL STARTS WITH THE FEEDERS. Units like this one below the raw mill feed bins are regulated by electronically controlled motors actuated at the central control panel. (Finish mill feeders are similarly controlled.)

Below:
MILL DEPARTMENT. All four mills (two raw, two finish) are identical 11- by 32-ft. units, and are driven by 2,000-hp. motors.



burning, finish grind, and cement distribution is controlled from an air-conditioned centralized control room just above the burning floor. This innovation was a pattern for the company's subsequent new installations at Tijeras and Ada. In effect, this centralized control was the common denominator for the design of all phases in the entire plant.

At the heart of the system is a nine-section instrument and control console. Each section is complete in itself and controls one phase of the operations. One section is provided for each of the four mills—two raw and two finish—and their associated equipment. Two more sections accommodate, respectively, the slurry tanks and pumping system, and transfer of clinker from the coolers to storage silos. One section is provided for each of the two kilns and its related cooler, and the final section houses control for distribution of finished cements to storage silos.

Most of the equipment operated from this center can be operated in either of two ways—on "automatic," as established on the control panel sections, or by locally mounted push-buttons. The latter also permit stopping any piece of equipment for emergency reasons. In the automatic procedure, the interlocked sequence of any particular phase is energized by one button, and the entire sequence also shuts down automatically, of course, in the event of failure of any component. Control of each individual phase is discussed below in the appropriate sequence.

Servicing of the instrument systems is handled by an instrument department headquartered in the floor immediately below the control room and housed in the same air-conditioned structure. In addition to repairing operations, the department maintains an inventory of spare equipment, thus critical delays are avoided.

Raw Materials Like its older companion operation on the same property, the new Houston plant is a wet-process facility utilizing oyster shells and clay as the basic mix components. As a part of the construction of the new plant, a 750-ft. dock was built to handle these incoming raw materials (barged in from shell dredging oper-

ations in Galveston Bay and from a clay pit nearby) for both the older and the newer operations. A P&H 1055 LC crane with a 4-cu. yd. Hayward clamshell rehandles the shell into a pair of hoppers supplying raw storage feed conveyors, and the clay is discharged into a clay soaking pit at the dockside.

A 2-cu. yd. drag scraper transfers the clay from the pit to a pair of 24-ft. diameter wash mills, from which the slip is raised in a centrifugal elevator to a 4- by 8-ft. single-deck screen with ½-in. openings. The slip passing this screen is pumped by 6-in., 900-g.p.m. pumps to a 129,000-gal. tank in the mill building, and to slip storage in the original plant.

Below each shell feed hopper, a 48-in. feeder transfers the shell to the respective one of two 36-in. wide belt conveyors leading to the raw material storage building. The latter has a craneway storage capacity of approximately 23,300 cu. yd., and is fitted with a 15-ton crane, on 100-ft. span, suspending a 6-cu. yd. Blaw-Knox clamshell bucket.

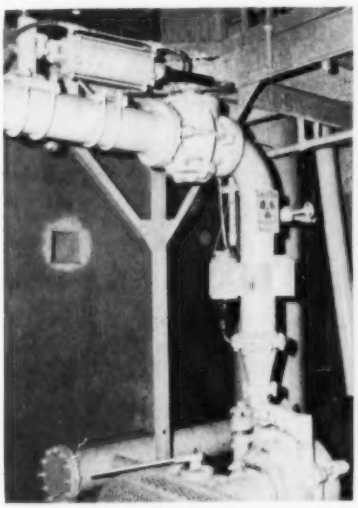
Shell entering the storage building is discharged into mill feed bins for direct withdrawal to the raw mill feed system, or for rehandling by clamshell into the storage area. Additives brought in by rail are discharged into a track hopper adjoining the raw storage, and are transferred *via* bucket elevator and conveyor to appropriate feed bins. Raw materials for use in the older plant are reclaimed from the above storage and transported by belt conveyor as needed.

In this raw-material handling and processing the major items of equipment include a Sauerman drag scraper, Wilfley pumps, an Allis-Chalmers Aerovibe screen, a Chain Belt elevator, Jeffrey feeders, Continental Gin conveyors, a P&H bridge crane, Merrick Feedoweights below the shell and additives mill feed bins, and Dorr agitators in the slip tanks.

The above feeders constitute the initial point of control in the overall system. Feed rate of the various materials entering the raw mill circuits is regulated *via* electronically controlled motors actuated from the raw mill panels in the central control room. Shell and dry additives are transferred from the appropriate feed bins to the 24-in. wide belt conveyors delivering these materials to the mills. Clay slip is transferred from the storage tank *via* 4-in. pumps to ferris wheel feeders preceding the mills. The tonnage of all these constituents of the mill feed is indicated and recorded on the control panels. Together, the shell and slip are proportioned to give a raw mill feed of about 77 percent Ca CO_3.

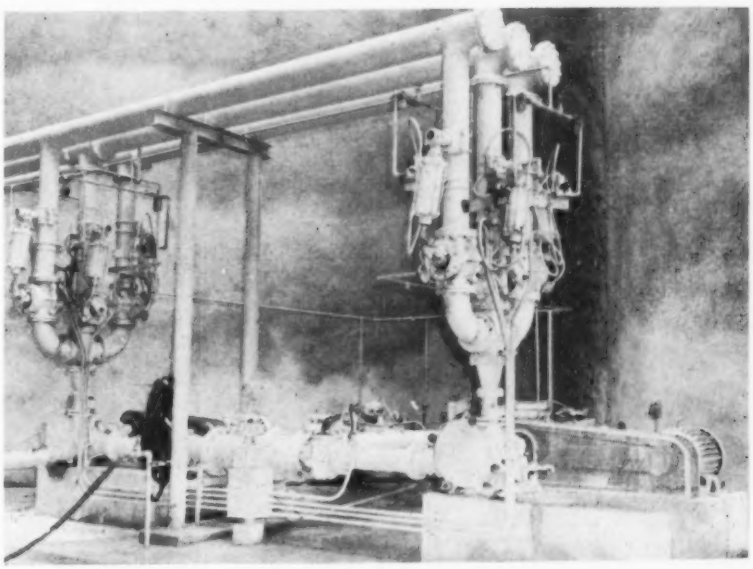
Raw Milling Each of the 11- by 32 ft. Compeb raw mills operates in closed circuit with two 5- by 8-ft. screens equipped with 20-mesh screencloth. These mills, driven by 2,000-hp. motors, probably the first of this size to be used in a cement plant, are rotated at about 17.4 r.p.m., and are fitted with 3-in. Lorain D rolled alloy liners throughout. The ball charge consists of 86,000 lb. of 2- and 3-in. balls in the first compartment and 248,000 lb. of 1¼-in. media in the second compartment.

The next significant point of control involves the make-up water, which is added to the slurry discharge of the mill and is automatically regulated by an Ohmart radioactivity sensing unit (with Ce 137) that determines slurry density and provides for additional water, as needed. *(Turn page)*

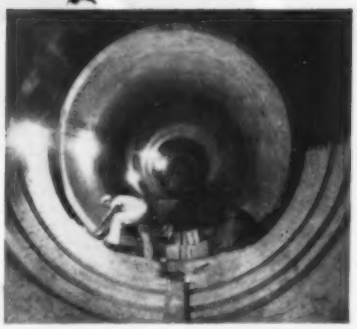


SLURRY DENSITY CONTROL. Raw mill slurry density is automatically regulated by radioactivity-sensing equipment, as shown in this closeup view.

Below:
DISTRIBUTION AND TRANSFER VALVES in the kiln feed tank slurry system. The hydraulic actuating cylinders are controlled from the central panel.



A. P. GREEN REFRACTORIES SERVE THE WORLD'S INDUSTRIES



A. P. Green 70% alumina KRUZITE liners being installed at Dundee Cement Company.

REFRACTORIES PAVED THE WAY

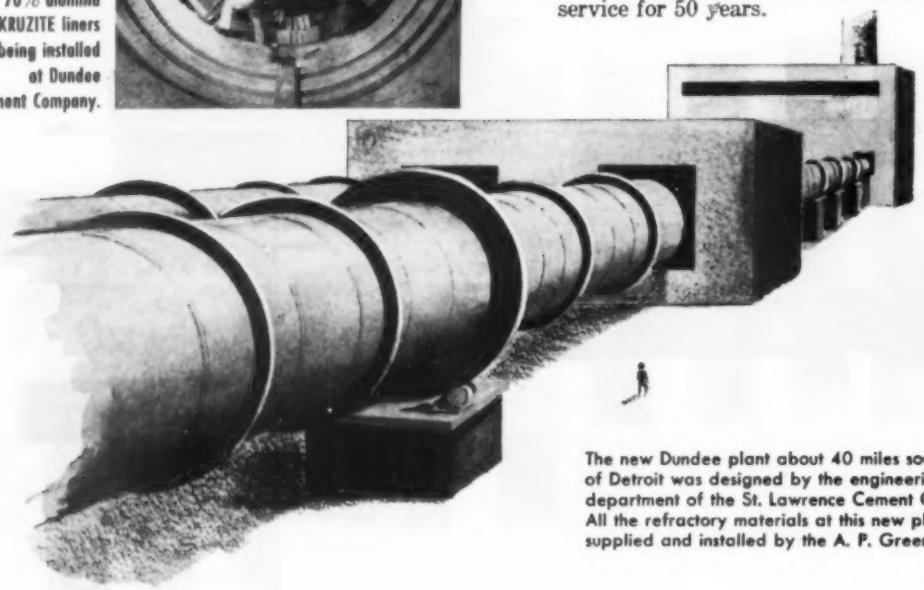
for the 146,000 mile network of U.S. concrete highways

From Washington to Alabama, California to the Carolinas — 48 of our states are united by broad highways of concrete. The federal highway program now in progress calls for an additional 41,000 miles . . . they'll begin in the nation's vast cement kilns — kilns that must be lined with high quality refractories.

The refractory products and engineering skills of the A. P. Green Company were used most recently in lining the two 16½ ft. diameter rotary wet process kilns of the Dundee Cement Company, Dundee, Michigan.

The first of these kilns has already proven itself with an output of 8000 U.S. bbl/day . . . surpassing any other cement kiln on the American Continent.

The cement industry is just one of the basic industries of the world in which A. P. Green refractory products have provided excellent service for 50 years.



The new Dundee plant about 40 miles southeast of Detroit was designed by the engineering department of the St. Lawrence Cement Company. All the refractory materials at this new plant were supplied and installed by the A. P. Green Company.

50 FIFTY YEARS OF PROGRESS A. P. GREEN FIRE BRICK CO.

A. P. GREEN FIRE BRICK COMPANY
MEXICO, MISSOURI U.S.A.

MANUFACTURERS OF A COMPLETE LINE OF HIGH QUALITY REFRACTORIES INCLUDING: FIRE CLAY, HIGH ALUMINA, SEMI-SILICA, SILICA, MULLITE, SILICON CARBIDE, ZIRCON, AND BASIC PRODUCTS.

Enter 122 on card, page 169

Mill discharge is pumped to the appropriate screen from which the oversize is returned to the mills; and the passing slurry, at about 60 percent solids and 75 percent passing 200-mesh, is transferred to one of the three slurry tanks feeding the kilns.

Basic processing equipment in the raw mill circuits include the two Allis-Chalmers mills, Ripl-Flo screens, and Wilfley pumps.

Kilns and Coolers The three kiln feed tanks are 55 ft. in diameter and 45 ft. high, and each holds enough slurry for 24 hours of operation of both kilns. All are equipped with Dorr agitators, and air is provided by Fuller compressors. Kiln feed may be drawn from any tank at any time, with control of individual kiln feed, recirculation, or other transfer regulated by remote control from the central panel. An automatic slurry level recording unit, designed by Ideal engineers, incorporates a digital counter for slurry level measurement, and provides a continuous record on a strip chart recorder for each slurry tank.

After light-off of the kilns with local fuel and draft controls on the kiln floor, subsequent control is handled completely from the central control room. Slurry pumped from the feed tanks enters the kiln feed pipes *via* ferris wheel feeders.

The complete installation for each of the two kiln circuits includes the 12- by 450-ft. kiln proper, a 6- by 100-ft. air-quenching cooler with a clinker breaker, a 150,000-c.f.m. cooler fan, an electrostatic precipitator, a 190,000-c.f.m. exhaust fan, cyclone collectors for the cooler, and a cooler vent fan. Common exhaust is through a 15½- by 250-ft. stack.

Installed on a slope of ⅜-in. per foot, the kilns are driven at 80 r.p.h. and are fired with natural gas. The kiln drives consist of a pair of 100-hp. d.c. motors hooked in series for each kiln. A d.c. generator set provides power for both kiln drives and feeder motors, and a constant relationship is maintained between slurry feed rate and kiln rotation. They are equipped (starting 17 ft. from the feed end) with 78 ft. of F. L. Smidth Valby type spiral chain. Refractory linings, starting from the firing end, consists of basic brick, 70 percent alumina, and 40 percent alumina.

Although operated in a conventional manner, the instrumented systems of the kilns permit this to be done remotely, with Utiliscope television units, and radiation pyrometers, utilized to monitor load and temperature conditions. Kiln exhaust temperature is controlled by instrumented operation of the kiln draft dampers; and cooler fan dampers are regulated in accordance with firing hood pressures. Burning zone temperatures, measured by the pyrometers, are translated into fuel valve control.

Other phases of kiln and cooler control handled from the central panels include cooler exhaust fan setting and kiln, cooler, and feeder speeds, etc. Strip chart recorders are used for major processing data, and a 10-point chart provides a record of continuous monitoring of the kiln operations.

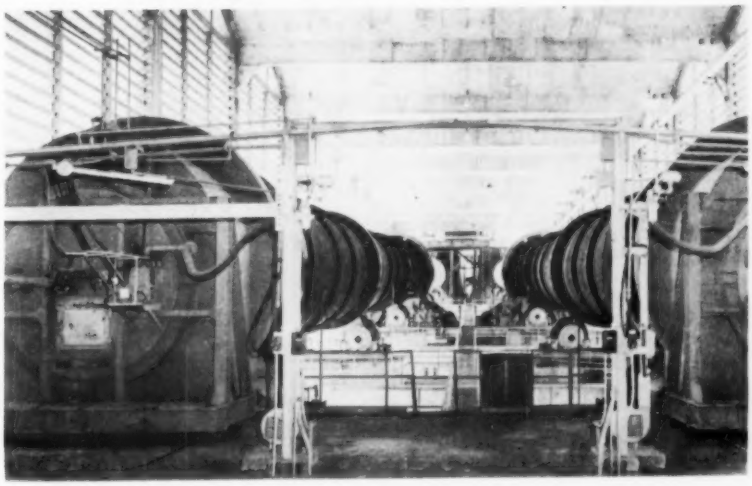
In these phases the major equipment items are the Allis-Chalmers kilns and coolers, A.C. kiln drives, a Caterpillar generator set, Buell precipitators (kiln exhaust) and cyclones (cooler exhaust), and American Blower fans.

Clinker Handling As discharged through the clinker breakers from the coolers, the clinker is transferred *via* natural frequency conveyor and 18-in. continuous bucket elevators to a distributing conveyor above a set of eight clinker silos.

The dual systems used in this transfer are designed to provide full control from coolers to silos, and to allow clinker to be handled simultaneously on the two, or to flow from

Right:
TV MONITORING—This closeup of one of the firing hoods shows one of the television camera installations.

Below:
A MODERN FIRING FLOOR, featuring remote control and television monitoring of firing conditions. The two 12- by 450-ft. kilns are gas-fired, and each has a 78-ft. spiral chain system.



one to the other. Each system also includes belt weighing and totalizing scales. Material-handling equipment is comprised of Continental Gin units, and Chain Belt elevators.

Each of the eight clinker silos—which serve as finish mill feed bins—has a capacity of slightly more than 13,600 bbl. Interstices are utilized for gypsum storage and feed.

As in the raw mill circuits, the above materials are drawn from this storage *via* Feedoweights under remote control from the central panels, with automatic proportioning for the finish mill circuits. The feeders transfer the materials to natural frequency conveyors, which in turn discharge to 12-in. continuous bucket elevators preceding the finish mills.

Finish Milling The two Compeb finish mills, identical in size and drive to the raw mills, are lined with 3-in. Lorain D rolled steel in the first compartment and 2-in. liners in the second. The first compartment, 9 ft. long, has 2⅛-in. alloy steel lifters, and the following section has 1⅝-in. lifters. The ball charge in the first compartment consists of 87,000 lb. of 1¼- to 3-in. balls, and in the second compartment 248,000 lb. of 1- and 1¼-in. balls. Each mill is closed-circuited with two 16-ft. separators.

Mill discharge is transferred *via* Airslides to 24-in. centrifugal bucket elevators, and again *via* Airslides to the separators. Finished cement from the latter is collected for transfer by 9-in., 550-bbl. Fuller-Kinyon pumps to storage silos.

In addition to the Allis-Chalmers mills, and their G-E drives, the major finish-milling circuit equipment includes the four Sturtevant separators, 60-ft. Norblo bag-type dust arrestors, 33,000 c.f.m. Norblo fans, and Chain Belt elevators.

Cement Storage, Loading A total capacity of 216,000 bbl. is available in the 21 silos (each 26 ft. in diameter and 96 ft. high) and the interstice areas. The pipeline common to the cement pumps in the finish-milling department branches into three feeding lines to Fuller alleviator-Airslide systems above the three rows of silos—all controlled from the central panels.

In a packhouse adjoining the silos are three 4-tube St. Regis 150FC bagging units. These are fed from the silos *via* rotary feeders below each storage section, screw conveyor, and bucket elevator. Each is an interlocked system controlled by the packer operator — the first phase subsequent to raw-material handling not regulated from the central control room.

Bulk loading for rail shipment, as well as for barges, is also handled from the packhouse panels. In these circuits, the screw conveyors below the silos feed a bulk-loading elevator in which the cement is carried to the appropriate bulk-loading Airslide system. Rail shipments are weighed out over a 50-ft. Fairbanks-Morse railroad scale. In the barge-loading circuit, a Richardson hopper scale and surge hopper is incorporated with the Fuller cement-handling units.

Plant Construction In conjunction with Ideal's engineering department, the general plans for the new plant were prepared by Allis-Chalmers, with plant structures designed by Klug & Smith Co. of Milwaukee. Engineering for the site preparation, utilities, dock, and dredging was handled by Lockwood, Andrews, and Newman of Houston, Tex. Dock work was done by Mid-Valley, Inc., Houston; dredging by Brown and Root, Inc., Houston; and preparation of the plant site by Gulf Bitulithic Co., Houston.

Left:
PLANT CONSTRUCTION. In the concentration on instrumentation and centralized control, the application of attractive and utilitarian concrete construction was not overlooked. Seen here is part of the barrel-roof and louverd curtain walls of the kiln building.

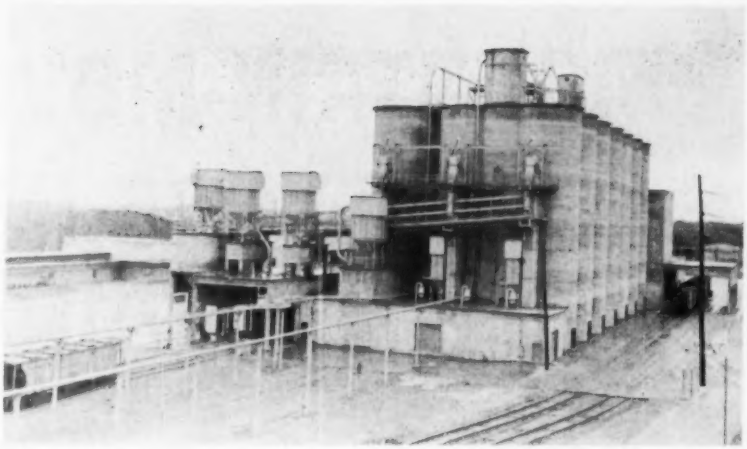
Below:
THE INSTRUMENT DEPARTMENT immediately below the control room is used for servicing and repair of the various systems, and accommodates an inventory of spare equipment.

Process control design and general electrical work for the plant was done by the Vern E. Alden Company of Chicago. Silos, packhouse, and wash-and-change and machine shop buildings were designed by Ken R. White of Denver. The silos and packhouse were built by Fegles Construction Company of Minneapolis. The rest of the general construction contract was handled by the Manhattan Construction Company of Texas. Reflecting the interest of Ideal management in correlating practical construction with attractiveness in concrete buildings, the structure housing the various operating phases and material handling systems display some interesting and efficient features. These included the precast columns and beams of the raw material conveyors, the raw material storage building, the barrel roof and the louvered sections of the kiln building.

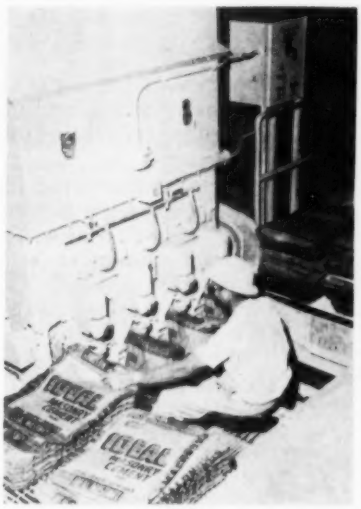
The interesting construction details of this operation, plus the pioneering instrumentation in its operating design, have made this plant a focal point of interest for visitors from abroad—Great Britain, Japan, Australia—as well as members of the industry in this country.

The original Houston plant, built in 1937, incorporated a single kiln, an 8- by 220-ft. unit, rated at 300,000 bbl. annually. This facility was acquired in 1940 by Ideal, and almost immediately the first of several extensive expansion projects was initiated. In 1941 a second kiln was added, bringing capacity up to about 720,000 bbl., and in 1947 the third was placed on the line, with related equipment, and production was boosted to 1,300,000 bbl. a year.

Now, with the new 2-kiln plant and its companion but separate older mill, the Houston operation has a total capacity of approximately 4,000,000 bbl. All operations at this location are headed by J. L. Conerly, plant manager. Ideal's southern regional production manager is Horace Straight.

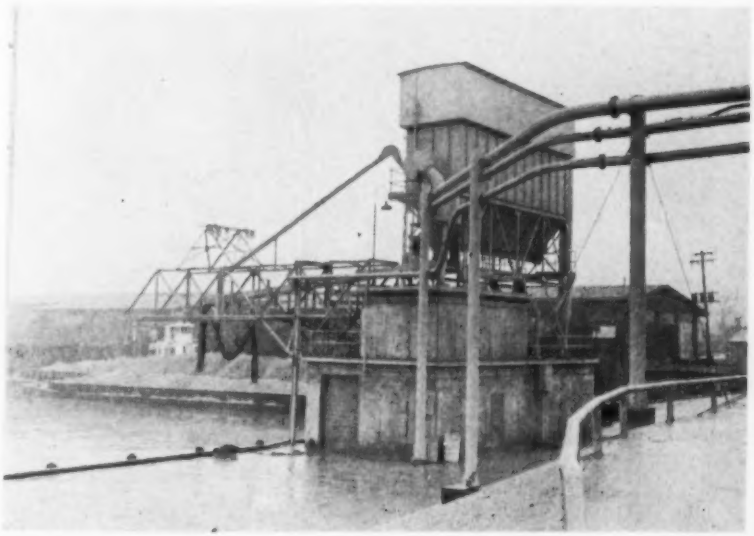


Above:
THE CEMENT DISTRIBUTION LINES above each of the three rows of silos is controlled from the central panels. Rail bulk loading, as well as bagging is controlled in the packhouse—the first phase subsequent to raw material handling not regulated by the central operator.



Right:
BAGGING—Three 4-tube bagging units are installed in the packhouse. Each is supplied from the silos via an interlocked system.

Below:
WATER SHIPMENT. A view of the barge-loading installation on the dock.



U. S. Glass & Chemical Corporation, will develop a $500,000 barite mine and plant at Dierks, Ark., with an annual output of 35,000 tons.

MOUNTAIN-MOVING BELT CONVEYORS IN 12th YEAR WITH ORIGINAL IDLERS

Barber-Greene conveyor system still going strong after handling up to 830,000 tons yearly for Blue Ridge Stone Corp.

The Blue Ridge Stone Corp., Roanoke, Va., is blasting, trucking, crushing and conveying away a limestone mountain at the rate of up to 830,000 tons yearly.

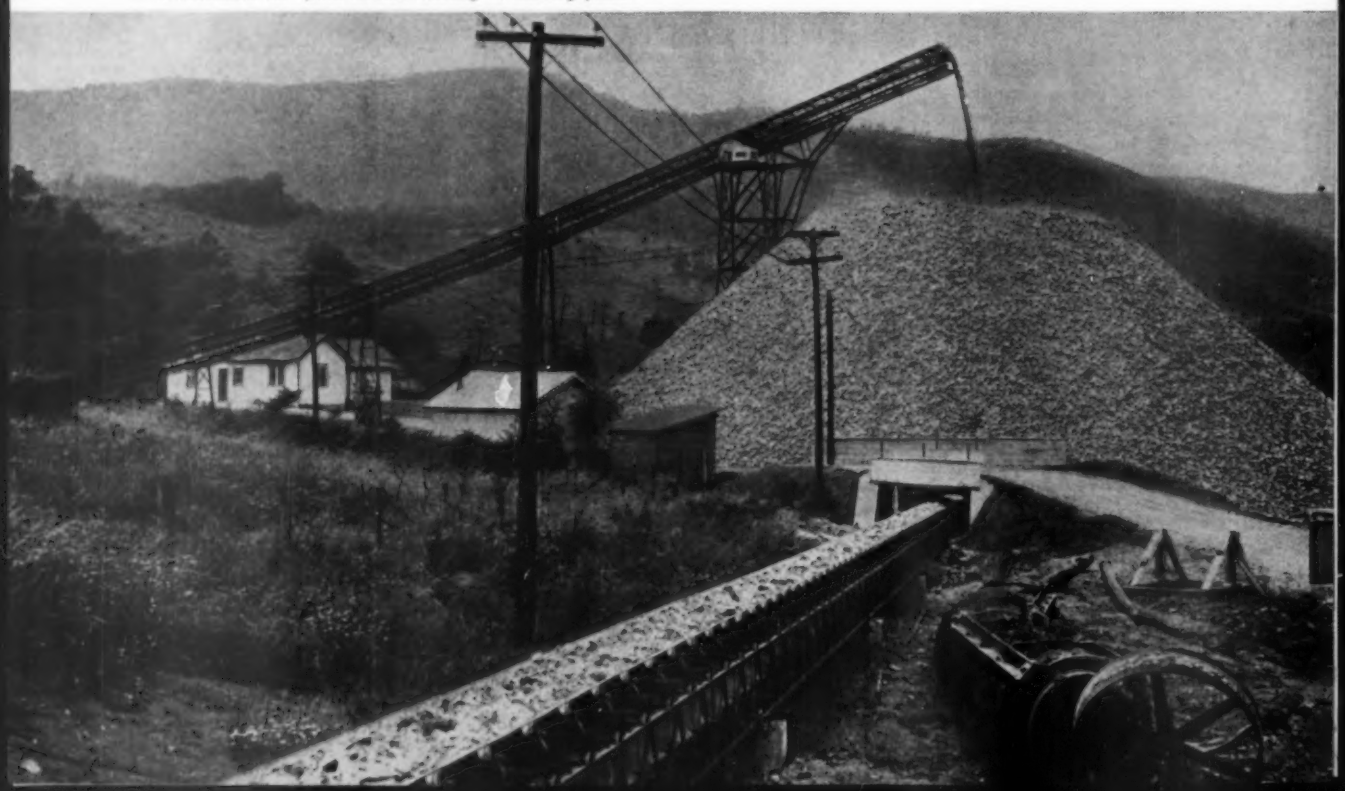
After trucks make the short haul moving blasted rock from face to primary crusher, a 4-flight, 4,150-ft. Barber-Greene conveyor system hustles the limestone from quarry floor to finishing plant.

President Abney Boxley observes, "We've increased production more than 30% over our old all-rail haulage method.

"Since our Barber-Greene conveyors became operative in 1948, we've had 12 years of dependable service with minimum maintenance and downtime. Practically all 1,500 original idlers are still in service and belt life has been extremely good.

"By including a 6,000-ton surge pile ahead of the No. 4 conveyor, we can operate the plant for

6,000-ton surge pile at end of 700-ft. No. 3 conveyor keeps finishing plant operating 24 hours after quarry shut-down. Rock is reclaimed on 1,600-ft. belt leading to finishing plant.



After double reduction of stone in quarry, limestone gets fast ride upgrade on 30" belt of 1,600-ft. Barber-Greene Conveyor enroute to surge pile and then to finishing plant. 4-flight system totals 4,150-ft.

as long as 24 hours after quarry operations have stopped if we bulldoze the stockpile."

Get this same lowest-cost-per-ton-mile solution to your material handling problems by calling your Barber-Greene Conveyor Specialist. He sells pre-engineered and pre-aligned standardized conveyors plus broad design experience . . . a combination that is preferred throughout the aggregate industry for hard-dollar reasons.

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New 44-page Idler Bulletin describes the more than 800 units available in the complete Barber-Greene line, tells how their years-ahead features bring longer life and greater economy to every job. Ask for your copy today.

Your belt conveyor equipment headquarters

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Finishing plant is last processing point for stone after 4,150-ft. conveyor ride from quarry. Short conveyor loads truck-loading hoppers. Bulk of output is loaded into railroad cars shown on siding.

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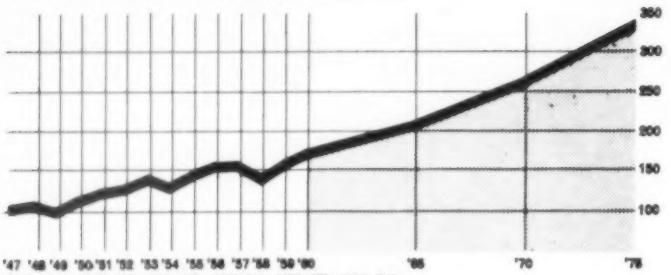
American-Marietta Forecasts U.S. Growth Possibilities through 1975

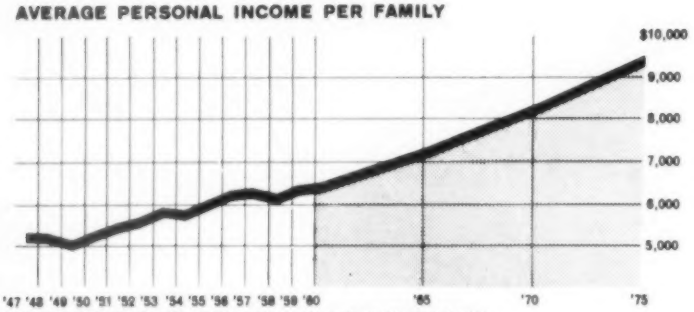
TOTAL INDUSTRIAL PRODUCTION

federal reserve board index (annual average: 1947-1949=100)



Estimates: 1959–160; 1960–170; 1965–210; 1970–270; 1975–340

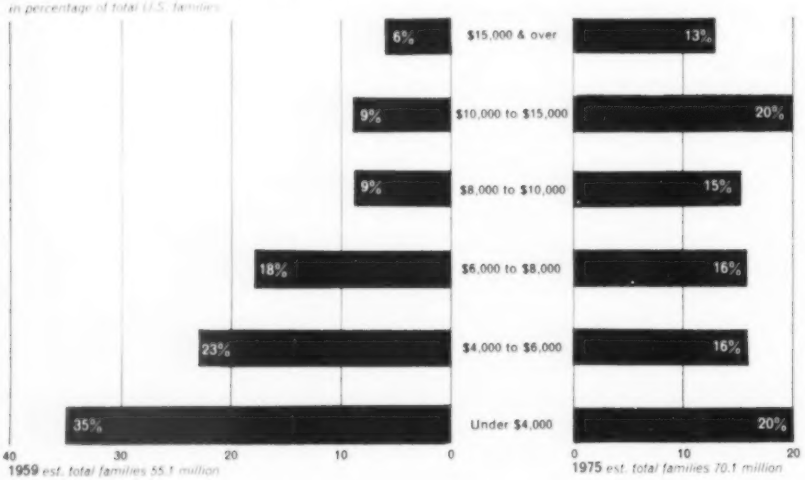
AVERAGE PERSONAL INCOME PER FAMILY



Estimates: 1959–$6,480; 1960–$6,500; 1965–$7,300; 1970–$8,300; 1975–$9,400.

DISTRIBUTION OF FAMILY INCOME

in percentage of total U.S. families



1959 *est. total families 55.1 million*

1975 *est. total families 70.1 million*

A doubling of the American economy; a nation one-third larger in customers and 50 percent richer per customer; demands for electricity almost tripling today's requirements; total purchasing power of families with incomes over $10,000 equaling today's *entire* consumer market—

These are the broad dimensions of the United States economy by 1975, according to one of the nation's major corporations. They are highlights of some startling projections in a significant and unusual economic study entitled *The Years Ahead: 1960 to 1975*, recently prepared for the American-Marietta Company.

These projections of currently measurable economic trends are the results of a special one-year economic study, a part of American-Marietta's continuing analysis of the economy. The company serves a wide range of American industry, from construction to manufacturing and packaging; it is the nation's seventh largest cement producer.

What motivating forces will lie behind the vast expansion that can be anticipated in the next 15 years? The report puts the analytical spotlight of economic research upon three salient factors:

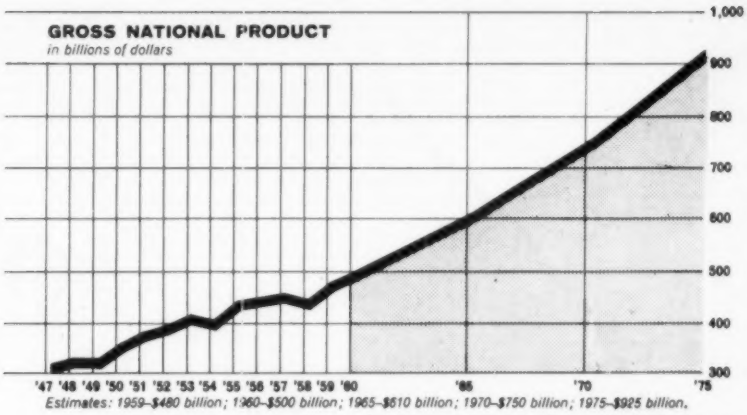
✓ A continuing and rapid increase in population.

✓ A new and greater period of construction that will dwarf the postwar building boom.

✓ An era of unprecedented technological progress.

In the 40-page illustrated report, these projections are documented with charts and graphs liberally footnoted with economic data. With few

• Leading nonmetals firm predicts 1975 G.N.P. up $425 billion, new construction outlay up $45 billion, cement shipments up 105%.



Estimates: 1959–$480 billion; 1960–$500 billion; 1965–$610 billion; 1970–$750 billion; 1975–$925 billion.

Charts by courtesy of American-Marietta Company

exceptions, all historic data are expressed in terms of 1959 dollars.

One of the unusual features of the report is that its findings anticipate the nation's economic growth beyond the 'sixties—covering a 15-year period to 1975.

Here are some of the major conclusions of the forecast.

The Economy as a Whole—In all measures of output, the economy of 1975 will be nearly the equivalent of two American economies of today. The gross national product—the value of all goods and services produced—now totals approximately $480 billion a year. By 1975, the gross national product will reach $925 billion, measured—it is important to note—in terms of today's dollar.

Family Income—On the average, the American family now earns $6,480 a year. By 1975, this average will have increased at least 50 percent—to an average of $9,400 a year, again measured in terms of today's dollar.

In 15 years, a full one-third of the 70,000,000 American families will earn $10,000 or more a year.

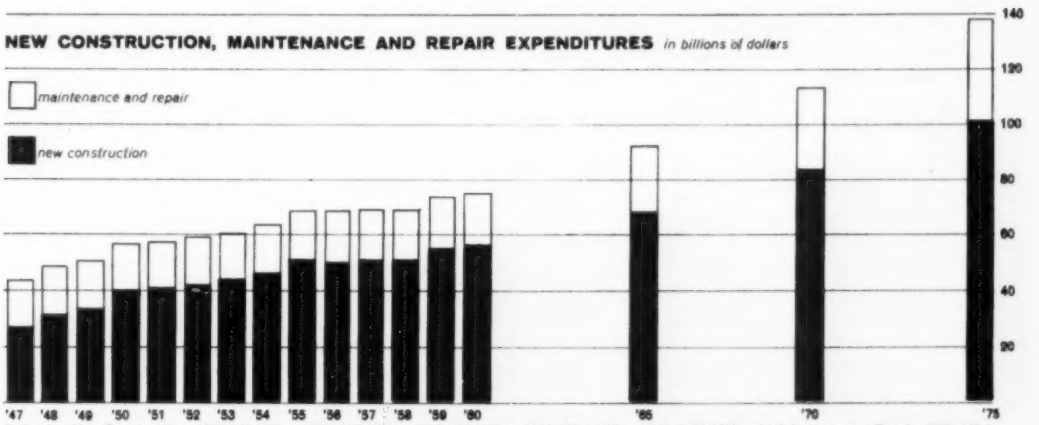
POPULATION

Since World War II the population increase has exceeded the total increase for the 1920's, the 1930's and half of the 1940's. Births will continue to increase, reaching an annual rate of 5,900,000 by 1975, compared with 4,280,000 at present. The nation's total population will rise by 55 million—from an estimated 180,126,000 persons in 1960 to 235,246,000 in 1975.

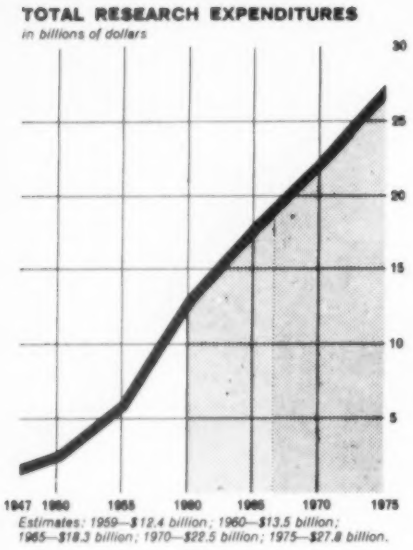
Consumer Market—The population increase will mean that for every three consumers in the market today, there will be four by 1975. As a special market stimulus, the number of young adults between the ages of 18 and 24 will have increased 70 percent, to a total of 27,500,000 in 1975. As examples of the importance of this age bracket, the report notes that young married couples spend 27 percent more than the national average for automobiles and 75 percent more than the average for television sets and furniture.

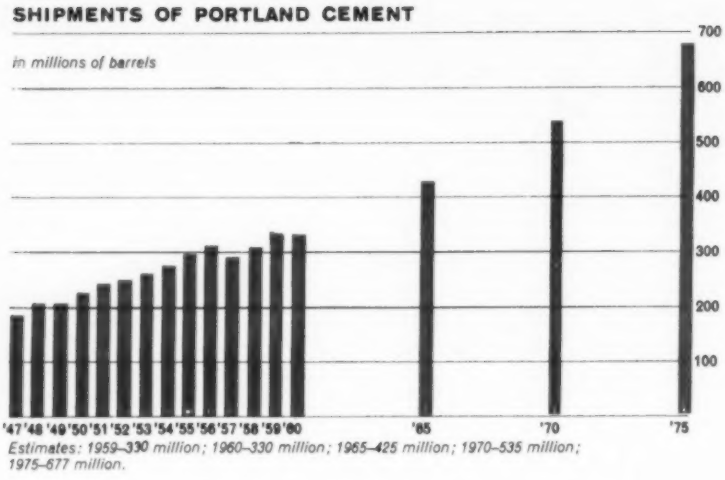
The Market for Essentials—Today the essentials of food, clothing, and shelter account for $165,000,000,000 of annual consumer spending. By 1975, this market for essentials will have grown to $274,000,000,000 a year, an increase of nearly 70 percent.

The Market for Discretionary Items—At present, $145,000,000,000 a year are spent by consumers for discretionary items, such as per-



Estimates–New Construction: 1959–$54 billion; 1960–$55 billion; 1965–$67 billion; 1970–$82.5 billion; 1975–$100 billion. Maintenance and Repair: 1959–$18.5 billion; 1960–$18.5 billion; 1965–$24 billion; 1970–$30 billion; 1975–$37 billion. Total: 1959–$72.5 billion; 1960–$73.5 billion; 1965–$91 billion; 1970–$112.5 billion; 1975–$137 billion.





sonal and medical care, appliances, recreation, and luxuries. In the next 15 years, this spending will increase 107 percent to more than $300 billion a year.

CONSTRUCTION

By 1975 the annual expenditures for new construction, maintenance, and repair will total $137,000,000,000.

Need for New Homes — More houses must be built in the next 15 years than in the last 30 years. The next 15 years will require the construction of 22,000,000,000 houses, and suburban home building alone will represent $400,000,000,000 in construction.

Construction for Business and Industry — In 1960 industry and business, including public utilities, will spend an estimated $36 billion for new plants and equipment. By 1975 this outlay will have increased to $66,700,000,000 annually.

Roadbuilding—A continuous increase in the number of automobiles will require accelerated highway construction programs. In the last 12 years, the number of automobiles has doubled, but highway miles have been increased only 4 percent since World War II. Fifteen years from now there will be 111,000,000 motor vehicles in use, compared with 71,000,000 today. In 1975, $11,300,000,000 will be spent for highways.

During the next 15 years our economic growth will require spending the enormous sum of $1,540 billion for construction materials, services, and labor, according to the American-Marietta report. "In itself, this will constitute one of the major forces of growth within the economy."

TECHNOLOGY

Of the economy's third major driving force—technology—the American-Marietta study concludes: "Every indication points to the fact that this age of technological discovery has just begun."

During 1975 research expenditures will total $27,800,000,000, compared with $13,500,000,000 in 1960. In the next 15 years, American business and government will spend more than $250 billion just to discover and perfect new products and processes.

"This huge effort—itself only a portion of a world-wide scientific exploration — represents the greatest organized assault upon the unknown that society has ever undertaken."

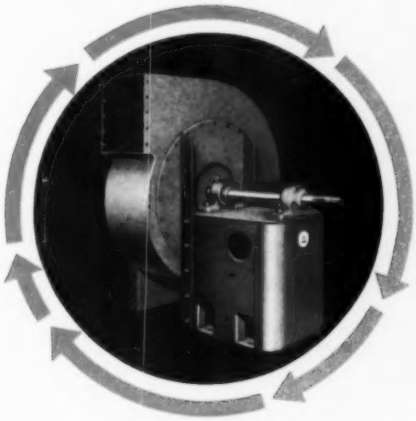
The report also includes charts of projected growth of several specific industries—paint, varnish and lacquer, Douglas fir plywood, paper and paperboard production, electric power, public sewer and water projects, textile sales and portland cement. *A doubling of demand is forecast for cement.*

According to Grover M. Hermann, company chairman, and Robert E. Pflaumer, president, the dimensions of the future which this study reveals are startling. These executives believe that the economic projections in the report can have broad significance for everyone concerned with American business and industry.

Copies of the report may be obtained from the Department of Information, American-Marietta Company, 101 E. Ontario St., Chicago.

American-Marietta, with headquarters in Chicago, produces a wide diversity of products, including construction materials and equipment, lime, refractories, cement, dyestuffs, printing inks, sealants, metallurgical products, machinery and equipment, cleansing products, paints, finishes, coatings, adhesives, resins, and chemicals.

A fire causing damage which may run into millions of dollars swept through the roofing plant of the Johns-Manville Products Corporation in Waukegan, Ill., on March 3. In addition to damage to the structure, heavy equipment was destroyed; but none of the employees working in the building suffered injuries. A concrete firewall prevented the fire from breaking through to six 50-ton asphalt storage tanks.



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the Coming Role of Pozzolans

Part V—Product Uniformity: Key to Successful Pozzolan Production

By WOLF G. BAUER
Consulting Engineer

IN past discussions we alluded to some of the wide variations in comparative physical and chemical results which may be expected when pozzolans of various types are used, or are processed in different ways. Thus the maintenance of product unformity for any one pozzolan or any one manufacturer is of particular importance.

Critical attention to this detail reflects not only the producer's desire to build up user confidence in pozzolanic materials as a whole, but also shows an awareness of his responsibility to the cement industry, its control problems, and its achievements therein. The concrete and concrete products manufacturers also are quite aware that every new additive to the concrete mix adds another potential variable affecting final product reliability. It is for this reason that I wish to emphasize the importance of processing control in pozzolan production, and to discuss some of the ways by which it may be achieved.

PROCESS VARIABLES

Variables to be brought under control may occur in any phase of the processing sequence, from quarrying through material preparation and storing and feeding; heat activating; grinding; classifying; and blending.

Raw Material Control Unlike portland cement manufacture, for example, where raw material control is exercised primarily *via* oxide and chemical composition of multicomponent blends or mixes, pozzolan raw materials are usually processed by themselves as received, whether of natural or by-product origin. Thus "control" may be more in the form of periodic "checks" on raw material and its deviations, than positive pre-processing regulation and composition adjustments. In view of such initial dependency on the raw material quality prior to processing, it is obvious that a deposit or supply of pozzolanic material—clay, shale, pumice, scoria, diatomite, silt, trachite, fly-ash, slag, or spent siliceous waste—should, first of all, be of high uniformity and dependability.

Initial up-grading by selective quarrying or size reduction and separating processes may bring about a leveling-out of material fluctuations, aside from a general raising of quality. Careful sampling techniques will allow check-testing before raw material usage. While chemical analyses in themselves may not reflect directly upon product quality, it is nevertheless possible to check on raw material deviations by testing one single chemical component only, e.g., index of refraction of a glassy material, differential thermal analysis, melting point or solubility, miscroscopic examination, or even simple grain size or color evaluation and comparisons, as a guide in holding to established maximum-minimum limits prior to processing.

However, unlike the cement plant chemist who can apply corrections through component additives and raw mix proportioning, the pozzolan control engineer may be forced to rely on a rather strict pre-processing check control system which may tend to be wasteful of portions of the supply or deposit. In severe cases of this sort his only recourse may be to establish a different processing schedule for the off-norm material and then re-blend within allowable product specification limits, either from clinker shed storage or finished product silo storage.

Heat-Activating Control While as yet relatively little has been learned or published on controlling the physico-chemical changes of pozzolanic minerals and derivatives through proper maintenance of process temperature, reaction time, and heating-gas conditions, a considerable amount of discussion has appeared in the literature with respect to rotary kiln control systems. The author's article titled *How To Improve Rotary Kiln Operating Control*, which appeared in the March, 1955, issue of PIT & QUARRY may serve as a background for the interested reader. However, since this subject is of major importance to pozzolan processing technology and covers several types of kilns and heating techniques, it will be best to give this topic separate and more detailed treatment in a later article.

Milling Process Control While cooling control of heat-activated pozzolanic materials is subsequent to heating control, such control is not normally applied except in instances where the pyro-plastic or glassy phase has been reached during heating, and where the cooling rate affects the degree of crystallization and lime reactivity, as in the case of quenched metallurgical slag pozzolans, for example. The final pozzolan processing phase requiring control is therefore that which includes particle size reduction and particle size gradation design and maintenance. Within this processing stage may also be included the additive proportioning and blending control system.

Variations in process may have

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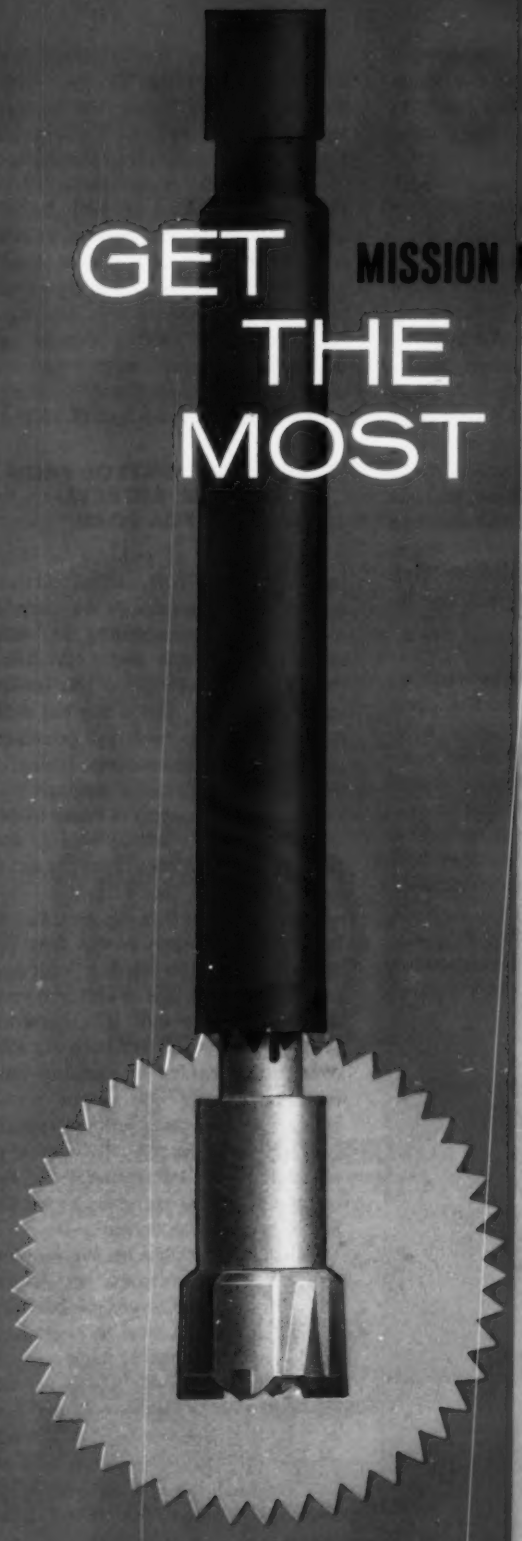

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their origin in mill feed bin material segregation or moisture content changes affecting weight, volume, and grindability. Due to improper feeder selection or design, there may be a lack of positive feed or multi-feed proportioning. Lack of time-lag sensing controls; automatic regulation within too wide a control band; lack of provisions for interlocking proportioning, or for material density checks and balances—all these will result in over- or under-loading grinding and classifying systems, with resultant performance variations. It may be of interest here to illustrate a few grinding control circuits in order to point up some of the more common problems involved.

The illustrated circuits show an assumed proportioning feed of crushed pozzolan and a fine powder additive such as hydrated lime. (To this system may also be added a solid or liquid feed-interlock system, as for a grinding aid or an accelerator, etc.)

Whenever feed weight varies due to sizing and density changes of material, a weight-controlling feeder should be used to feed the grinding system. By the use of suitable vane-pocket rotary valve feeders, plus a weighing belt of special construction, powders, too, can be weigh-fed. However, free-flowing powders or fines can also be fed by volume from a small constant-head surge hopper located below the supply bin. Such a hopper is fed from the bin with a non-flushing screw or rotary valve discharger controlled by material level switches in the hopper which maintain a near constant level, and therefore material bulk density.

Feed to the mill is then by variable-speed sealed non-flushing screw or rotary pocket feeder. If automatic air jets are used to prevent material plugging in the bin bottom, provisions should be made for air relief in both bin bottom and feeder hopper, as bulk density will otherwise be affected. Weight accuracy varies widely under each condition, and one should probably not expect less than a 3 percent deviation from the norm, although it may be possible to tolerate 5 percent or more in some instances.

Multi-feed Proportioning Whether two or more feeders operate all on a volumetric or weight basis, or on both, maintenance of the desired weight proportion ratio is of first importance. In the accompanying milling circuit diagrams we assume both feeders to be operated from variable-speed transmission. Small a.c. or d.c. generators are coupled to their output shafts to operate a corresponding tachometer on the mill control panel.

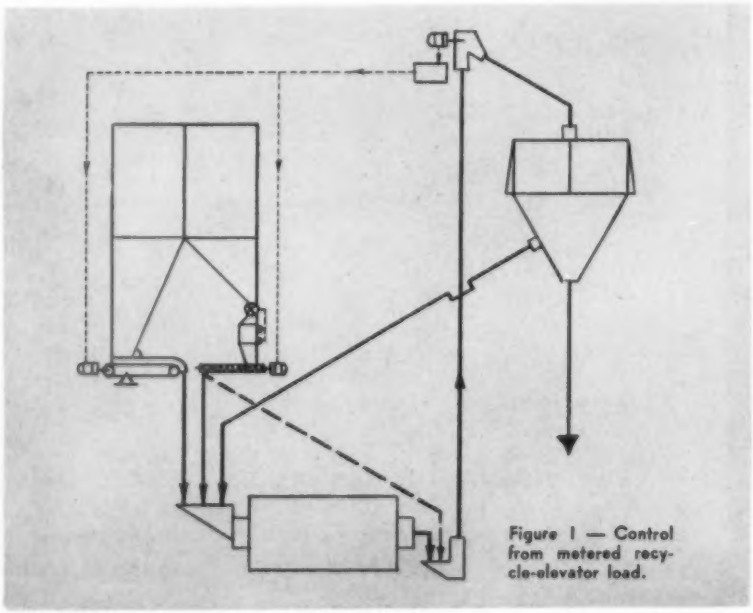

Figure 1 — Control from metered recycle-elevator load.

The purpose of the tachometers is to allow the operator to check-synchronize or "trim" his two feeders and maintain them thus. Tachometer scale can be graduated in percentage of full speed. Bleed-off splitters should be provided at each feeder discharge chute for weight-check control. In the circuits shown, feeders are regulated by ammeter or weight-beam controllers through small reversing motors located on the variable speed feeder transmissions. Four basic control arrangements are illustrated and discussed.

CIRCUIT I—CONTROL FROM METERED RECYCLE-ELEVATOR LOAD

In this circuit (Figure 1) the total mill output flow is measured *via* motor current variations on the recycle elevator, and a controlling ammeter signals or corrects such variations through timer relays on the feeder speed regulators. The writer has used this control approach for pozzolan grinding with some success. It should first be made operative through visual-manual regulation in order to determine the time-lag, as well as the amperage variations for proper automatic controller specifications.

It can be seen that the chief drawback of this system is the flow reaction lag between sensing point and regulating point, due to material residence time in the mill. It is therefore primarily a method to flatten out mill overloading cycles by causing corrections or reversals in the trend curves. With a short mill or impact-type pulverizer, this drawback is somewhat reduced, although the use of reset timers to compensate for the lag is needed for automation.

This circuit represents the simplest and often the cheapest regulation, but it does not differentiate between a high mill load due to high feed rate, and one due to high recycle rate. In most cases, however, the recycle rate is the controlling rate in fact. If recirculating loads are relatively small, the sensitivity and effectiveness of this control is reduced. With relatively uniform raw material conditions and only one feed component to the mill, it has been possible to correlate pozzolan specific surface area directly to the amperage used by this motor.

It should be pointed out that the

25% more hole per hr.

in hard limestone with high silica content

...than with competing rig

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T-650 truck-mounted REICHdrill operating in a quarry. Hole size: to 7⅞"; down pressure: 30,000 pounds. Other models available, truck or crawler mounted, with hole size to 16 inches, down pressure to 90,000 pounds.

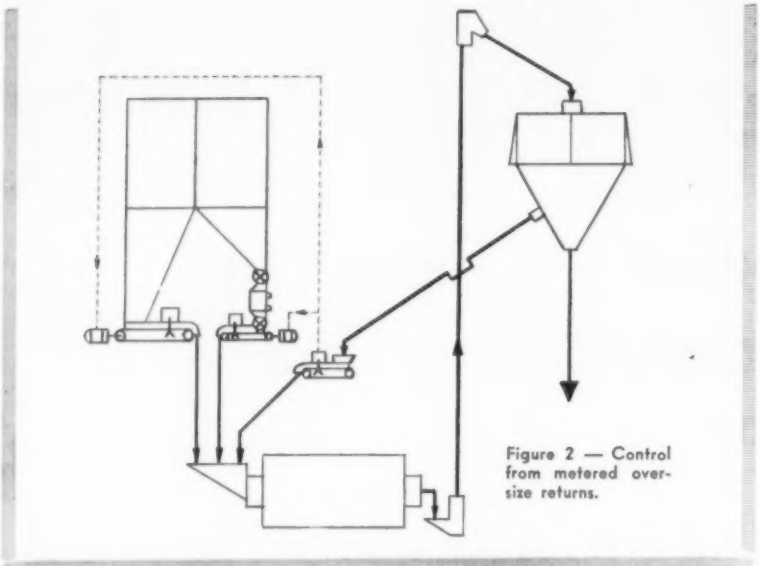


Figure 2 — Control from metered oversize returns.

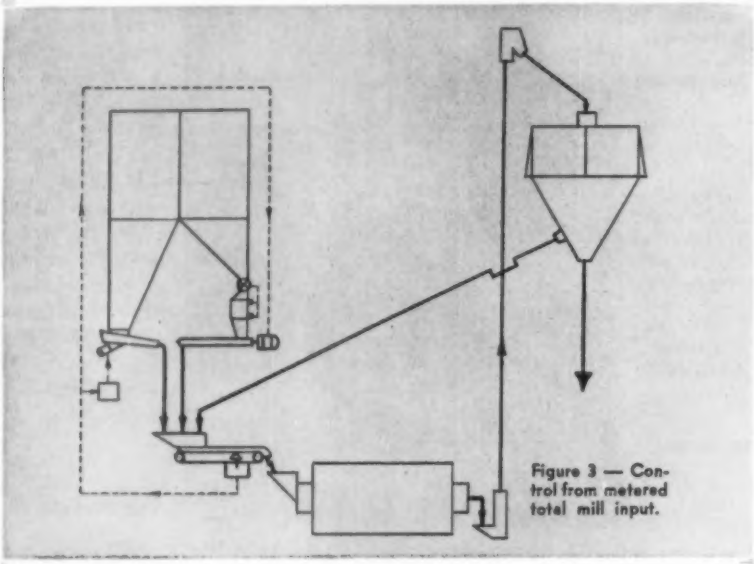


Figure 3 — Control from metered total mill input.

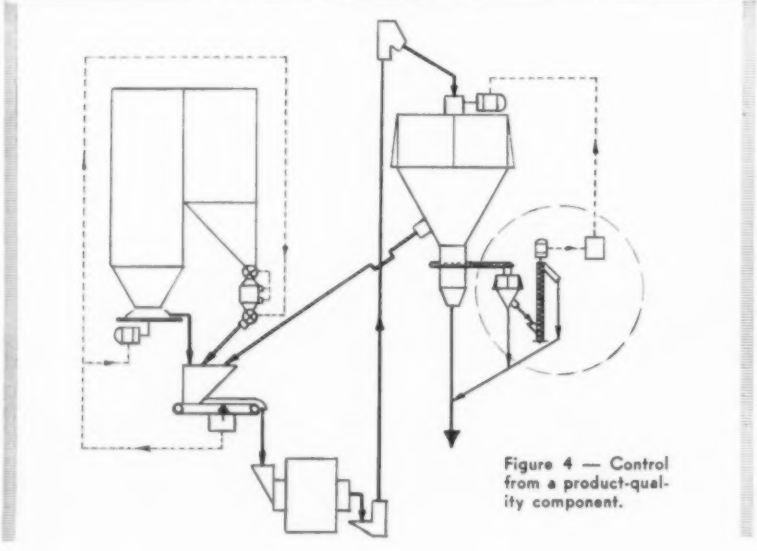


Figure 4 — Control from a product-quality component.

material flow lines in the control circuit diagrams can be routed differently than shown. If, for instance, the fine powder feed-component is of substantial proportional volume, the mill output and efficiency can be increased by feeding this component directly to the elevator, by-passing the mill and scalping off the oversize for grinding only, as shown by the alternate dotted line in Figure 1.

CIRCUIT II—CONTROL FROM METERED OVERSIZE RETURNS

Coarse oversize returns from the classifier can be weighed continuously between the latter and the mill. As variations of the grindability within the mill are reflected by corresponding fluctuations in the flow of the classifier rejects, it is possible for the belt-scale controller to change the speed of the primary feeders to compensate for such variations.

When full weight control is desired, three such weigh-feeders are needed; and this fact can be considered one of the drawbacks of this type of control circuit. The inherent time-lag for re-establishing balance can be somewhat compensated for by the use of two re-set timers. In comparing this circuit (Figure 2) to that shown in Figure 1, it becomes obvious that the masking effect of the finished-product component of the material stream has been eliminated at the control point, thus providing a more sensitive direct regulation.

CIRCUIT III—CONTROL FROM METERED TOTAL MILL INPUT

In this control circuit (Figure 3) the total weight of primary feed, plus coarse recycle is held constant at an optimum value (which may or may not be determined by an electric-ear type of regulator), primary feed being compensated-controlled as a function of variations in classifier rejects flow. Unlike circuit II, it is absolutely necessary to use weigh-control primary feeders in this circuit. The outstanding advantage of circuit III is its more rapid regulation of mill loading with the elimination of mill time lag. In conjunction with the electric ear, it should provide a rather modern and stabilized grinding-classifying operation.

(Concluded on page 148)

Ontario A.P.A. Meeting

Covers Highway Building Problems

W. B. Bennett, Oshawa, was elected president of the Aggregate Producers Association of Ontario at the third annual meeting, held on January 13 at the Seaway Hotel, Toronto. About 120 persons attended the meeting.

Other officers elected were: A. T. Lowe, Unionville, first vice-president; J. B. Regan, Highland Creek, second vice-president; Charles Armstrong, Brampton, secretary; and Donald Marshall, London, treasurer. The three past-presidents comprise the board of directors — William Jack, Highland Creek; Doug Sherman, Port Credit; and Stafford Smythe, Toronto.

Stafford Smythe, in presenting his president's report, commended J. M. Duff and his committee on transportation and Doug Sherman and his legal committee. Mr. Sherman's group had prepared and presented a brief to the Ontario Transportation Minister Yarenko. This brief was instrumental in obtaining modifications in an amendment to the Municipal Act which would have been detrimental to the industry.

Mr. Smythe warned that the amendment can still hamper operations, and that Toronto Township has stopped an operator from stripping a new section of his gravel pit. The case now awaits a court decision. Mr. Smythe also recommended that the Ontario Department of Highways make a survey of available gravel sources and that a public relations program be inaugurated to get the industry's story across to the public.

Alex Wylie, executive secretary, also urged that the members should lose no time in putting their case before the public, which is unaware of the major role aggregates play in Canada's economy. He also asked for further amendments of the Municipal Act, so that good reserves of natural aggregates will be made available to the people of Ontario.

Alex Rutka of the Ontario Department of Highways discussed the role of natural aggregates in building highways. He mentioned some of the factors, such as frost action, which affect decisions of the departments in determining whether or not certain aggregates should be used. He also outlined tests carried out by the department and mentioned the possibility of upgrading poorer deposits if natural aggregates become less generally available.

The dinner speaker, W. M. Philpott, general manager, Ontario Road Builders Association, briefed the audience on the activities of his group and sketched case histories describing services performed for member companies which had saved them thousands of dollars. He stated that the response to questionnaires sent out by his organization averaged a 92.9 percent return, and never less than 86 percent.

J. H. Reid, director, National Sand and Gravel Association of the United States, brought greetings from his group and outlined some of its activities.

Six new active members and seven associate members joined the association in 1959, and several others have indicated their intention of joining.

Alex Rutka, Department of Highways, Province of Ontario, who discussed the role of natural aggregates in highway construction.

William Bennett, named president of the Aggregate Producers Association of Ontario for 1960.

HENNING HILLIARD has been elected to the board of directors of the Louisville Cement Company, succeeding his father, ISAAC HILLIARD, who recently resigned. The new director represents the fourth generation of his family to serve on the board of the 129-year-old company.

CLIFFORD J. HICKS has been named assistant secretary of the American Institute of Mining, Metallurgical, and Petroleum Engineers, and also western field secretary, with headquarters in Salt Lake City. He succeeds the late ROY E. O'BRIEN.

LLOYD L. SCHWARZ has been named St. Louis territory sales manager of Universal Atlas Cement Division of U. S. Steel Corp. He succeeds W. TROY GAUNT, who is retiring after 35 years of continuous service with the firm. Mr. Schwarz was formerly assistant sales manager in the St. Louis territory.

W. D. MILNE, president of Kentucky Stone Company, Louisville, has been elected a director of Lincoln Bank and Trust Company in that city. He fills a vacancy created by the recent death of WILEY B. BRYAN, who was chairman of the board of Kentucky Stone.

10,000,000 TONS OF AGGREGATES

■ Balance Glen Canyon Dam specifications with local available materials and pumice to meet concrete strength requirements

By HARRY F. UTLEY

ANOTHER ON THE SPOT report

AFTER a paralyzing delay due to a strike which stopped all activity for six months, work is again under way on what is doubtless the country's largest construction project—Glen Canyon Dam, located on the Colorado River in Arizona, only a few miles below the Utah line.

The general contract is held by Merritt-Chapman & Scott Corp., which won on its bid of $107,955,522. This is the largest contract ever awarded by the Bureau of Reclamation and the biggest competitive construction contract ever given to a single contractor.

The strike involved the four basic construction craft unions and the operating engineers. It began on July 6, 1959, and ended by agreements signed on December 22, 1959. Not until late in January, 1960, was actual progress in construction resumed, after a period of de-scaling, rehabilitation, and maintenance. The big aggregates plant was nearly completed when the strike began, but only about 50 percent of the work on the concrete plant was finished.

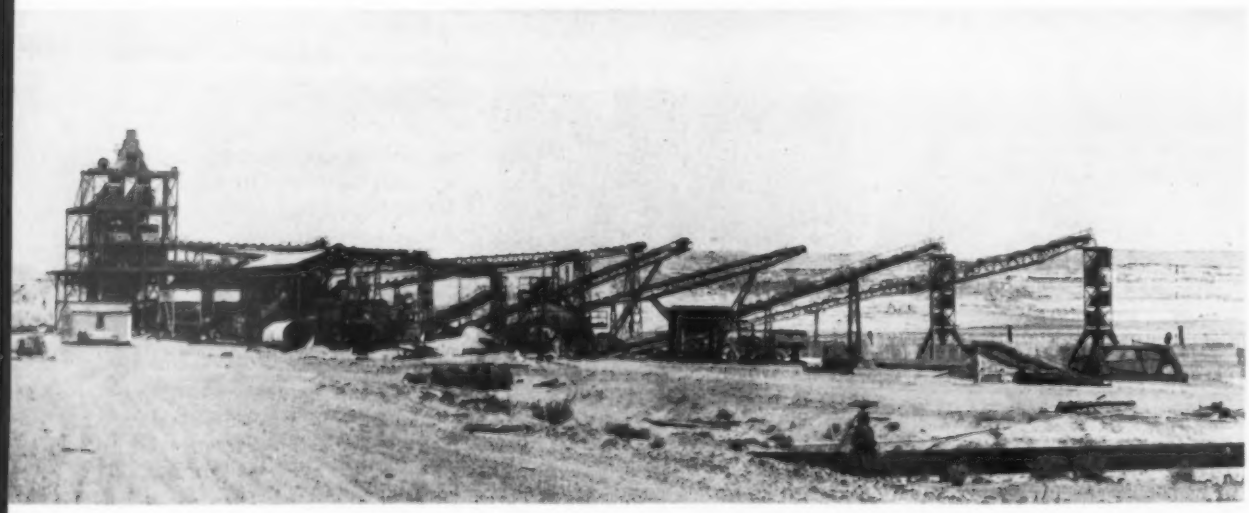
Aggregate Plant An earlier article[1] described some of the general features of the project and early aggregate production with a pilot plant of 200-t.p.h. capacity. This small plant served as a temporary batch plant which prepared the concrete for preliminary structures prior to the big push.

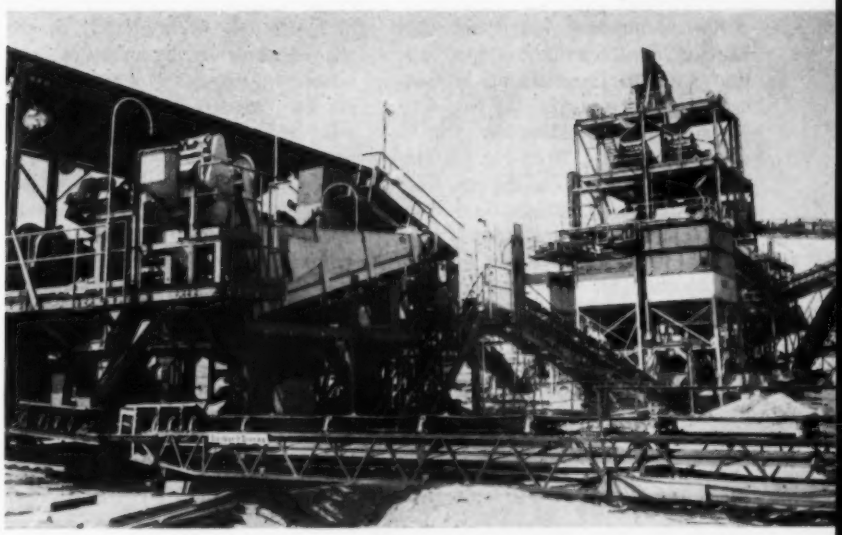
Now a huge aggregate processing plant has been erected. This installation has an input of 1,400 t.p.h. and an output of 800 to 1,000 t.p.h. to carry out the contract, which will not be completed before 1964 or 1965. It will produce a total of about 10,000,000 tons of sand and gravel. Some of this material will be beneficiated in a dual heavy-media-separation department for the 5,500,000 cu. yd. of concrete required for the dam and power plant.

Large aggregate deposits are scarce in that area, which is predominantly red sandstone; and early exploration pinpointed the best available source along Wahweap Creek. This narrow, 7-mile long deposit lies

[1] PIT AND QUARRY, May, 1959, pp. 80-82.

THE BIG AGGREGATES PLANT was near completion when the 5½-month strike began in July, 1959. This overall view shows the stacker belts, the screening tower, and the two H.M.S. beneficiation lines (under the roofed structure).





Right:
THE SAND-BENEFICIATION SIDE of the H.M.S. plant and the surge bins and screening structure (right background).

Below:
CONSTRUCTION SITE. This upstream view in Glen Canyon shows the cofferdam and the new highway bridge. The diversion tunnels, one of which is seen at the left, will become a part of the spillway tunnel system after the completion of the dam and the powerhouse in 1964 or 1965.

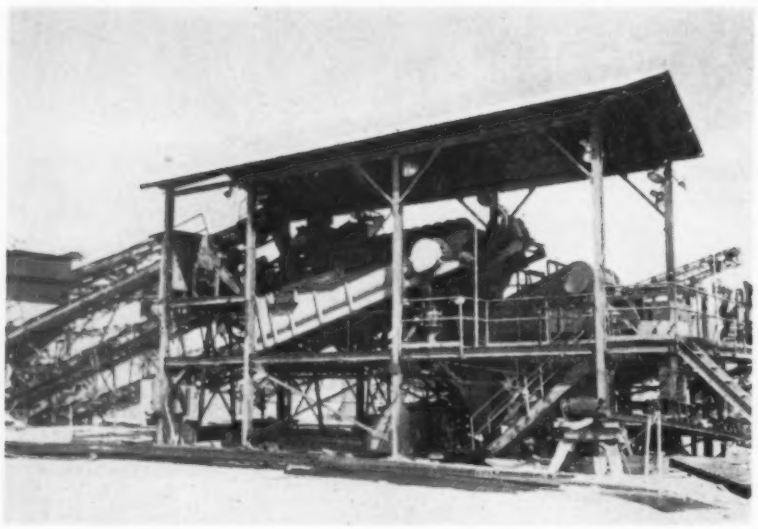
from 6 to 13 miles northeast of the dam site and varies from 1,000 to 1,500 ft. wide.

Pit-run material, based on usual Bureau of Reclamation specifications, contains insufficient 3- to 6-in. cobbles, and a surplus of No. 4 to ¾-in. material. There is also a deficiency of No. 30 to No. 16 material, and an excess of the pan fraction and material retained on the No. 100 and No. 8 sieves. (See Tables I and II) Besides, excessive amounts of objectionable lightweight shales, calcareous cherts, sandstone, etc., with a specific gravity of less than 2.50 occur throughout the deposit; these materials must be floated out by heavy-media separation.

Since the specifications call for not more than 0.15 percent soluble sulphate in the sand, a wash-water problem was encountered, as the ground-water supply in the pit area contains up to 2,200 p.p.m. of sulphates. This has been solved, however, by blending water from a series of deep-drilled wells with that obtained from Wahweap Creek. A storage facility with a capacity of 4,500,000 gal. has been created by shaping an earthen reservoir near the new aggregate plant and lining it with heavy plastic fabric. Besides supplying aggregate-plant needs, the reservoir also serves the contractor's requirements at the dam site. A 20-in. Taylor spiral-welded pipeline extends from the reservoir along the aggregate haul road for a distance of more than 5 miles to Glen Canyon.

Left:
CONVERGING CONVEYORS blend minus No. 8 washed natural sand with No. 4-No. 8 beneficiated fraction.
Photo: U. S. Bureau of Reclamation

Below:
H.M.S. PLANT. This view shows the two heavy-media-separation lines. Material to be beneficiated arrives via the conveyors at the left. Two separate and distinct flowsheets are used; the two departments are side by side and differ mainly only in the type of separatory vessel employed.



The most desirable and most economical mass concrete, in the Bureau's opinion, should contain 25 to 30 percent of 3- to 6-in. cobbles. However, the Wahweap contains only about 10 percent of these, and a supplemental source of cobbles could not be located within economical hauling distance. Of course, additional cobbles in the amount desired might be scalped out from some 10,000,000 cu. yd. of additional material in or near Wahweap Creek, but this would have entailed prohibitive expense.

Therefore it was decided at the Bureau, after an exhaustive program of tests, that the minimum concrete-strength requirements could be met by using 2 sacks of cement per cu. yd., plus one sack of pozzolan, and a cobble content as low as 13 percent —the maximum amount of 3- to 6-in. cobbles obtainable through efficient operation of the deposit and processing plant.

Because of offending rock types, the specifications require that the No. 8 to 1½-in. aggregate used in all exposed concrete be beneficiated to remove material having a specific gravity of 2.50, or less. About 20 percent of the materials in this size range are lightweight, the coarser fraction containing somewhat less and the fine fraction somewhat more than this percentage. Beneficiation is, therefore, limited to these sizes, since there is very little lightweight gravel in the plus 1½-in. sizes, and no known effective and economical process that can remove lightweight fines from the minus No. 8 sand.

The new high-capacity aggregates plant utilizes the heavy-media-separation departments which were part and parcel of the pilot plant, the remainder of which has since been dismantled. The same general plant flowsheet was employed for the present installation, except that screening, washing, and sand-classifying capacity was greatly enlarged, as was the storage area for finished aggregates.

Two 6½-cu. yd. Lima draglines make up the main excavating team in the pit area, and load 30-cu. yd. capacity Euclid belly-dump trucks which deliver to the plant receiving

Table I. Pit-Run Grading and Specification Limits—Gravel

Screen Size	Individual Percent (by Weight) Retained on Screen	
	Specification Limits	Pit-Run Grading
3 to 6 in.	13 to 30	10
1½ to 3 in.	20 to 35	21
¾ to 1½ in.	20 to 35	27
No. 4 to ¾ in.	20 to 35	42

hopper. Plus 6-in. boulders are grizzlied out to waste. Conceivably, these large donikers might be crushed to make up some of the 3- to 6-in. deficiency in the pit, but Reclamation Bureau specifications permit no crushing whatever of the Wahweap aggregates.

A 36-in. by 350-ft. inclined belt conveyor builds up a pit-run surge pile with a live storage capacity of 30,000 tons. A tunnel reclaiming belt system (36 in. by 900 ft.) delivers from surge to the screening-and-washing structure. All gravel sizing is done over a battery of four 6- by 16-ft. Hewitt-Robins spray-equipped screens, two double-deck and 2 triple-deck units making up the lines. The screens produce the specified four gradations of washed-and-sized coarse aggregate: 3 to 6 in.; 1½ to 3 in.; ¾ to 1½ in.; and No. 4 to ¾ in. These aggregates are conveyed separately and lowered by rock ladders to build up storage piles over a straight-line truck-loading tunnel.

Minus No. 4 screen throughs and water are spouted to a set of three Eagle Iron Works 7-spout water scalpers which classify and clean up the sand; waste and save fractions can be controlled at the spouts to conform to Bureau specifications as to gradation (Table II), and the sand is then dewatered by Eagle double-screw dehydrators. The sand is split at No. 8 mesh, and stacked in two conical piles—one a No. 4 and No. 8 composite, the other from No. 8 down to pan.

A portion of three sizes of material produced in the screening plant is drawn off for up-grading by heavy-media separation. These are: ¾- to 1½-in. and No. 4 to ¾-in. gravels; and No. 4 to No. 8 sand. Each is contained in a 50-ton Butler surge bin and fed *via* Syntron feeders to belt conveyors leading to the beneficiation section.

Early attempts of the contractor to beneficiate the gravel and sand as a composite material in the No. 8 to 1½-in. range failed, since the float product carried off a large portion of the fine sinks, and the sinks themselves did not consistently meet specifications.

Finally, two separate and distinct H.M.S. flowsheets were developed—one to handle the 1½-in. to No. 4 gravel, the other to upgrade the No. 4 to No. 8 sand. The two departments are arranged side by side under a common roof and differ mainly only in the type of separatory vessel employed.

A 54-in. Akins spiral separator now handles the gravel, re-combined from the two gravel-feed bins. The sinks come off the upper end of the screw flights while the floats overflow the lower weir (pool section) to waste, after washing to recover the media.

The No. 4 to No. 8 sand enters a 7-ft. Wemco cone-type separatory vessel, and the sinks are recovered by air-lift. The deep, relatively-quiet pool formed by the 7-ft. cone apparently was the key to improved sink-float beneficiation of the sand; earlier, unsuccessful attempts had been confined to use of the spiral only for the combined material.

After separation of the sink product and unwanted float material in the two heavy-media lines, recovery of the media is largely conventional, as in other H.M.S. plants in operation in a dozen or so commercial aggregate plants.

Products are drained and washed over Allis-Chalmers and Hewitt-Robins screens, and the recovered media is densified, magnetized, and de-magnetized with Dings equipment for re-use. The usual combination of magnetite and ferro-silicon is used with water to create a separatory liquid of 2.50 specific gravity. The ratio of magnetite to ferro-silicon is somewhat higher on the magnetite side in the cone, while the reverse

Table II. Pit-Run Grading and Specification Limits—Sand

Screen Number	Individual Percent (by Weight) Retained on Screen	
	Specification Limits	Pit-Run Grading
No. 4	0 to 5	—
No. 8	5 to 15*	16
No. 16	10 to 25*	10
No. 30	10 to 30	7
No. 50	15 to 35	17
No. 100	12 to 20	32
Pan	3 to 7	18

*If individual percent retained on No. 16 screen is 20 percent or less, the maximum limit for the individual percent retained on the No. 8 screen may be increased to 20 percent.

AGGREGATE HAULAGE. The "fleet" of two 30-ton-capacity semi-trailers which delivered aggregates from the pilot plant (now dismantled) has now been increased to 12 units of identical design. They operate on the 5-mile haul road.

OWNERS AGREE: A '60 CHEVY IS WORTH MORE BECAUSE IT WORKS MORE!

"I CAN HAUL JUST ABOUT AS MUCH WITH THIS CHEVY AS I CAN WITH A BIGGER TRUCK AND FOR LESS MONEY."

That's a 1960 medium-duty Chevrolet, but there's sure nothing medium-duty about the load. Mr. J. E. Blankinship, Arkansas logging contractor, says this truck "moves along at 40 to 50 miles per hour with mountainous payloads and maintains a 5-trip-a-day schedule with no trouble at all." That's about 200 hard-working miles a day. And Chevy's Torsion-Spring Ride smooths every mile of the way. As Mr. Blankinship puts it: "I can haul just about as much with this medium-duty Chevy as I can with a bigger truck and for less money. Chevies cost me less to buy, less to operate, and still they carry just about as big a payload."

■ They're speaking right up, these owners of '60 Chevrolets, talking about a new truck-and-tire-saving ride that leads to shorter trip times, too. Chevy's independently suspended front wheels step right over bumps, virtually eliminate most of the severe impacts that can wear out trucks and tires before their time. You profit by a big savings on maintenance; get a bigger daily work output because these trucks float you over rough roads with fewer slowdowns. New Chevy cabs are built to last longer, boost driver efficiency. There's more leg room, head room and hip room; new visibility that's greater by more than 26%, new foam-padded seat, new tougher construction features—double-panel roof, box-section door pillars and many more. Efficient power that knows the most about saving money. There's the big 283-cu.-in. Taskmaster V8—a truck-built 160-h.p. power plant that does more work per dollar, or the time-proved 150-h.p. Jobmaster 6. Look into it for yourself; Chevy's totally new working ability is at your dealer's right now. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

1960 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET

is true in the tub of the spiral where the gravel is up-graded. Loss of media is estimated at about 1 lb. per ton of recovered sinks, possibly a bit higher. The up-graded gravel and sand is produced at the maximum rate of 100 t.p.h.

H.M.S. gravel is re-sized over a Telsmith finishing screen before it is stacked in the storage bunkers. H.M.S. sand is stacked in a conical pile alongside the two piles of natural sand. From these piles, the sands are blended as required before they are sent to the bunkers. Blending is accomplished, simply and effectively, by merging the trajectories of the ribbons of sand as they leave a pair of conveyors at the head-pulley ends of the belts. Gradation of the sand is shown in Table II.

There are eight storage bunkers for finished materials, separated by timber bulkheads, each with a capacity of 3,000 to 4,000 tons. They contain the various sizes of coarse aggregates, both natural and H.M.S. processed, and the natural, beneficiated, and blended sands. The semi-trailers which carry the material to the dam pass through a 525-ft. tunnel beneath the piles. The driver controls the fill gates by a lanyard; loading requires only about 10 seconds.

The delivery fleet consists of 12 Cook Bros. 30-ton semi-trailers pulled by 300-hp. Mack diesel tractors. Trip time over the 5-mile haul road is about 20 minutes.

Waste material of all types as it is rejected throughout the plant is carried away by flumes and a conveyor-belt circuit. Most of the conveyors in the plant were supplied by Barber-Greene.

Ready-Mix Plant At the construction plant at the dam, the semi-trailers discharge to a hopper which feeds an inclined belt running to a high trestle. The latter supports a horizontal conveyor which trips the aggregate into its proper pile. A reclaim conveyor in a tunnel beneath the piles delivers the aggregates to the big concrete plant which has been erected on a shelf cut into the canyon wall 300 ft. below the rim.

The concrete plant, which rises 217 ft. high from bearing plate to the top of the screen tower, was built by the Noble Company. All coarse aggregates are re-screened before they are deposited in the 8-compartment, 3,000-ton storage bin. Four compartments store regular coarse aggregates, two contain H.M.S. gravels, and the other two are for natural, blended, or H.M.S. sand.

Under the automatic weigh batcher six 4-cu. yd. Smith tilting mixers are arranged in a circle to mix approximately 480 cu. yd. of concrete hourly. Mixing time is specified at 2½ minutes. Mix proportions are shown in Table III. A revolving feed spout charges the mixers, which discharge into collecting hoppers loading 12-cu. yd. cars. The latter, in turn, transfer the concrete to 12-cu. yd. Garbro placement buckets. These are 50 percent larger than any buckets previously used on a dam project. Two 50-ton-capacity cableways handle the buckets.

At the concrete plant, operations are so automated that one man can operate the entire plant. Content, cycle, mix time, and other variables are automatically recorded on electronic tape.

Two 700-bbl. surge silos, one for pozzolan and one for cement, adjoin the concrete plant. Up on the canyon rim, seven steel storage silos, each of 10,000-bbl. capacity, store the cementing materials. Four are used for cement, three for pozzolan. Airslides carry from the silos to the concrete-plant surge bins.

A large-scale refrigeration plant is being built on a ledge above the concrete plant for service next summer, since the concrete must be within the range of 40 and 50 deg. F. at placement. In colder weather, when the temperature drops below 40 deg., 1 percent of calcium chloride is added as an accelerator.

The refrigerating plant includes an ice-making system, a mixing-water cooling system, an air-cooling circuit connected to the aggregate bins in the concrete plant, and an after-cooling circuit for the piping embedded in the dam itself. During hot weather the aggregate is to be sprayed with 3600 g.p.m. of ice water enroute to the batch-plant bins, and cooled further in the bins by chilled air blasts. Both ice water and chipped ice will be used in the mixers. An air-entraining agent is specified for all concrete.

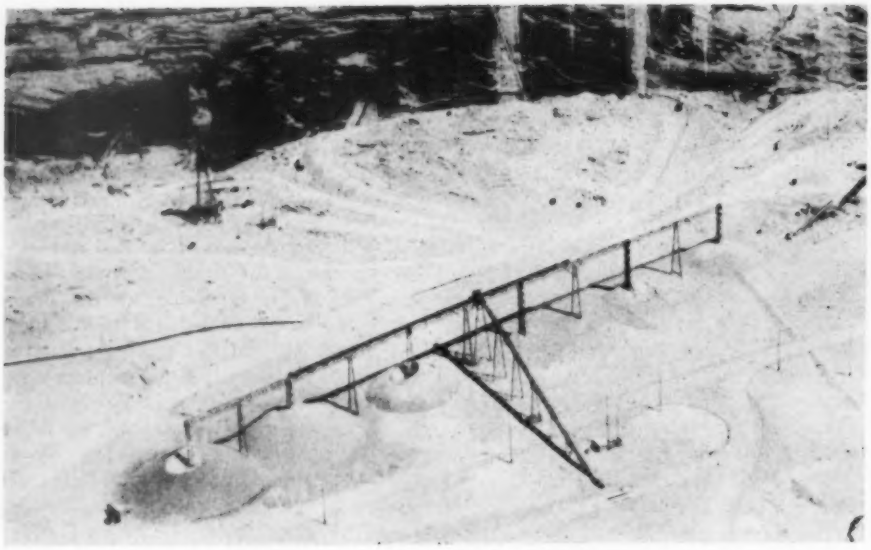
Pozzolan Plant From the conception of the project it was anticipated that pozzolan would be used in most of the concrete (Table III). Nearly 100 samples of volcanic material within a 200-mile radius of the dam were tested. A pumicite deposit about 30 miles north of Flagstaff, Ariz., and about 100 miles south of Glen Canyon appeared to be the most promising source of supply. It was found that this material would require grinding only, whereas a good volcanic-shale deposit about 50 miles closer would require both calcining and grinding.

A separate contract for the production of pozzolan was awarded by the Bureau of Reclamation to to J. R. Shotwell, Seattle, who has set up a processing plant close to

Table III—Batching Requirements for Cement, Pozzolan, and Aggregates

Maximum Size of Aggregate	Cementing Materials Portland Cement plus Pozzolan (approximate)		Sand, Percent of Total Aggregate	Coarse Aggregate, percent Coarse Aggregate Only			
	Total Sacks per cu. yd. of Concrete	Percent Pozzolan (by Weight of Cement plus Pozzolan)		No. 4 to ¾ in.	¾ to 1½ in.	1½ to 3 in.	3 to 6 in.
6 in. (interior)	2.5 to 3.5	20-35	20-28	20-35	20-35	20-35	13*
6 in. (exterior)	3.5 to 4.5	20-35	20-28	20-35	20-35	20-35	13*
3 in.	3.5 to 5.0	0-25	26-31	25-40	20-40	20-40	....
1½ in.	4.0 to 6.0	0-25	31-37	45-60	40-55	....	....
¾ in.	5.0 to 7.0	0-25	40-46	100	....	....	....

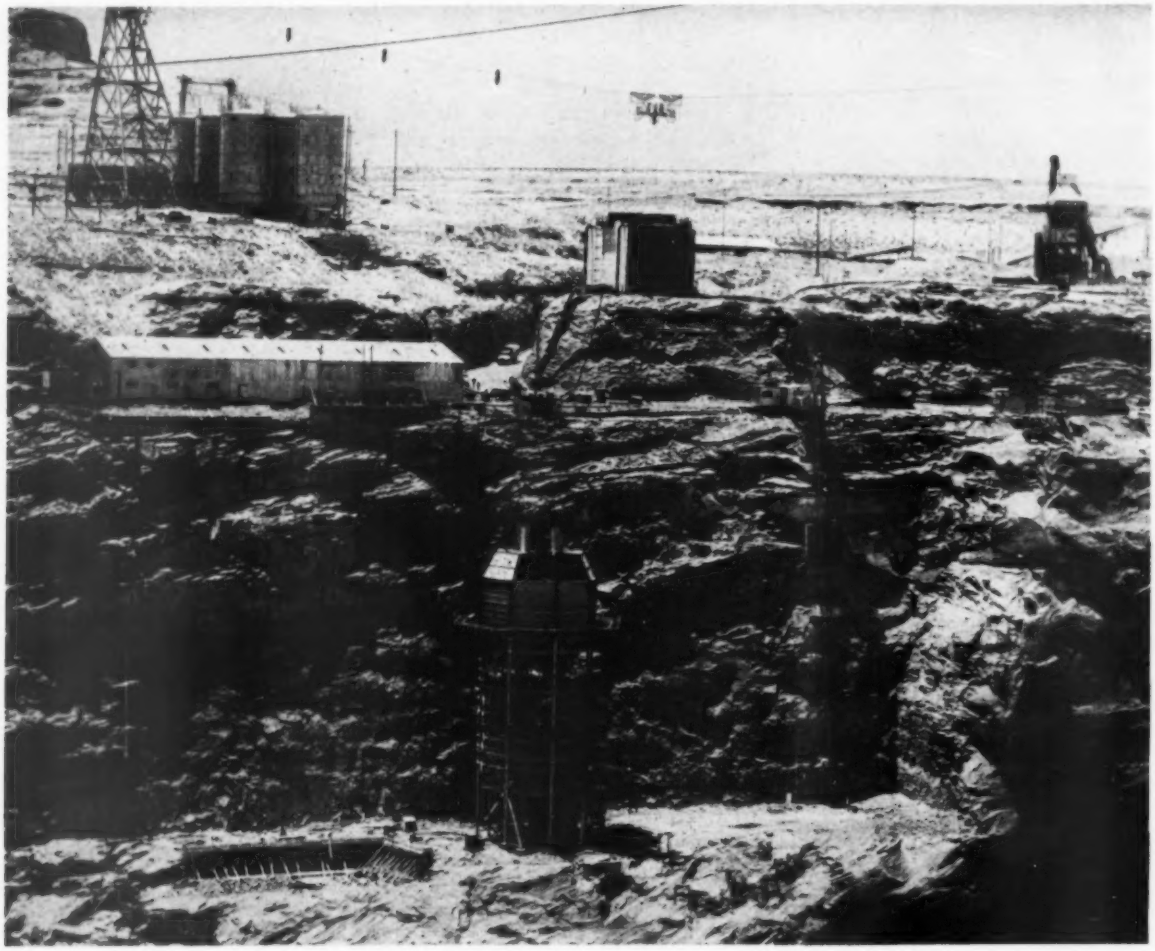
*Since there is a deficiency of 6-in. coarse material in the deposit, the percentage of this size will be held to the 13 percent minimum.



Left:
AERIAL VIEW OF AGGREGATE STOCKPILING trestle and conveyor system at the dam site. A tunnel reclaim conveyor beneath the piles delivers to the concrete plant bins. (This view shows the canyon rim from the opposite vantage point of the picture below. For correlation of perspectives, use the cableway tower as a location point. The silos were not yet constructed when this photograph was taken.)

Below:
CONCRETE PLANT. This picture shows the concrete plant while it was under construction; the mixers are already in place but installation of re-screening equipment above the compartmented bin has not yet started. The refrigeration plant is on the bench above. To the right of the cableway tower (top of picture, above the refrigeration plant) are the seven 10,000-bbl. silos for storage of cement and pozzolan. The pilot batch plant is visible at the upper right.

Photo: U. S. Bureau of Reclamation



U. S. Highway 89 to produce the 220,000 tons (about 1,200,000 bbl.) required by the Glen Canyon dam.

Specifications call for grinding to a Blaine specific surface of not less than 7,000, and not more than 15 percent retained on a 325-mesh screen. The 75 percent reduction in expansive reaction which is usually required was lowered by the Bureau in this instance to 60 per cent because of the protection provided by the low alkali cement used.

At the Shotwell plant, selective excavating of the pumice is practiced over a wide area of the deposit to insure a high-grade material for processing. Trucks dump the material to a hopper, and any plus 3-in. stone is rejected by an Overstrom screen before an inclined conveyor carries it to a surge pile.

Wasting of raw material larger than 3 in. was decided upon when it was found that good pumicite occurred as smaller pieces, so both good or bad raw material is wasted if it is oversize.

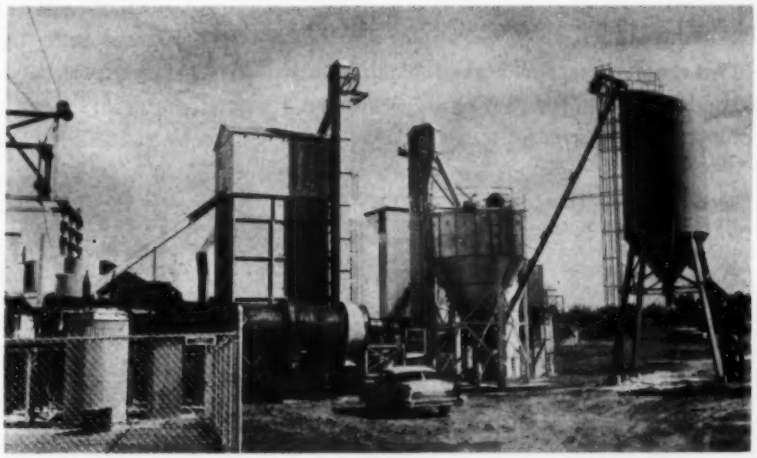
From the surge pile tunnel another belt delivers to a Madsen oil-fired rotary drier, where the lumps are subjected to 400 deg. F. of drying heat. Considerable disintegration occurs in the dryer, and all plus ¼-in. product leaving the dryer is screened out and chuted to a 20- by 30-in. Cedarapids hammermill. This mill is in closed circuit with the drier; and all the mill product passes through the drier again on the theory that the larger particles will not have dried as thoroughly as the finer.

The dry fines are then binned and fed to a Sturtevant ring-roll mill, followed by a Williams 5-roll Super-Titan roller mill, both with air separation, until the specified fineness is attained. The finished pozzolan is then stored in tight steel bins and loaded out into bulk cement trucks for delivery to the dam.

General About 3,000,000 bbl. of portland cement, delivered at a peak rate of 120,000 bbl. per month, will be required for Glen Canyon Dam. Type II cement is specified; and because of potential reactivity of the Wahweap aggregate, it must be of low-alkali content. Maximum temperature as delivered to the silos on the canyon rim is 170 deg. F. This temperature limitation, Bureau spokesmen believe, will reduce the chance of false set in the silos and will aid the contractor in controlling refrigeration, so as to keep the concrete below 50 deg. F. at placement.

The cement contract was awarded in its entirety to the Phoenix Cement Company, an American Cement Corporation subsidiary which already had the erection of a new plant at Clarkdale, Ariz., under consideration. The haul from Clark-

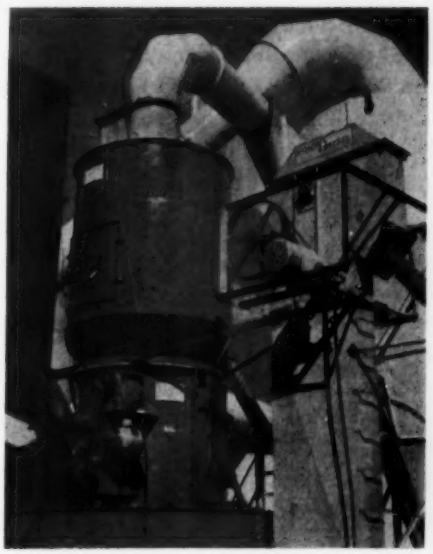
(Concluded on page 148)



PUMICE-POZZOLAN OPERATIONS—a general view of the Shotwell installation for Glen Canyon. The truck-loading bin at the right has a by-pass chute leading to a packer, permitting material to be bagged if desired. The rotary drier is at the left.

Left:
RING-ROLL MILL which operates as a first-stage grinding unit after the pumice is dried.

Right:
THIS ROLLER MILL with air separation grinds the pozzolan to the required fineness.



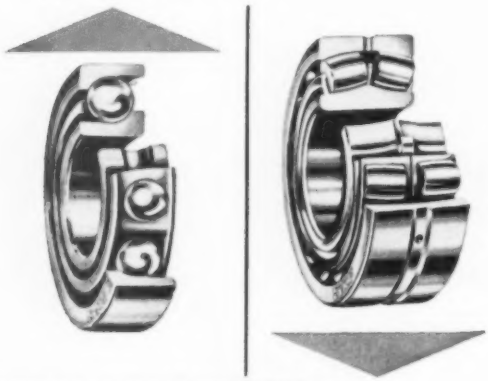
EVERY TYPE—EVERY USE
SKF®
INDUSTRIES, INC., PHILADELPHIA 32, PA.

Spherical, Cylindrical, Ball, "Tyson" Tapered and REED Miniature Bearings

ANGULAR CONTACT BALL BEARING

This is the bearing to use when you need a high-speed bearing to support either (a) heavy thrust load, or (b) thrust load combined with radial load. It lends itself to various mounting arrangements. For example, if you need axial rigidity and high radial capacity you can mount two of these bearings in pairs either face-to-face or back-to-back. Or, if very high thrust capacity is needed, you can mount two or more of these bearings in tandem.

This standard bearing is available in over 80 sizes of single- and double-row types. Bore sizes range from ¾" to just over 7".



SPHERICAL ROLLER BEARING

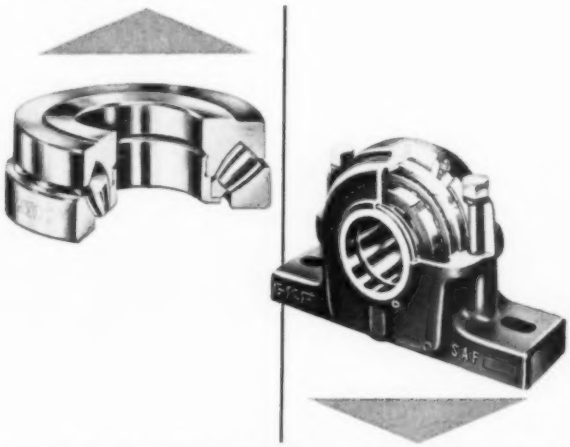
SKF invented the spherical roller bearing almost forty years ago. Since then, we've improved the original design several times—so that, today, our Type "C" spherical roller bearing offers longer life and 33⅓% greater capacity.

This increased capacity is largely due to the number, size and shape of the rollers—and the improved accuracy with which they're guided. Because these bearings are inherently self-aligning, their full capacity is always available for substantial thrust load in either direction as well as heavy radial load. These bearings also have special lubricating grooves that channel lubricants directly to the spherical rollers.

SPHERICAL ROLLER THRUST BEARING

Need a thrust bearing capable of carrying unusually heavy loads? Then specify this self-aligning spherical roller thrust bearing. It will carry either heavy thrust or combined thrust and radial loads. Because of its ability to carry high thrust at high speeds, this bearing is frequently chosen over large angular contact ball bearings for heavy-duty applications.

SKF makes this bearing in twenty-five standard sizes ranging from 4.3" to 14.9". And it's competitively priced.



TYPE SAF PILLOW BLOCK...with self-aligning ball or spherical roller bearings

Here's a rugged cast-iron pillow block that provides high efficiency with low friction.

We make this split pillow block with ball bearings for normal loads and with spherical roller bearings for heavy loads. We also equip it with Triple-Seal rotating rings that effectively protect the bearing from abrasives and corrosives, and prevent oil or grease from leaking out.

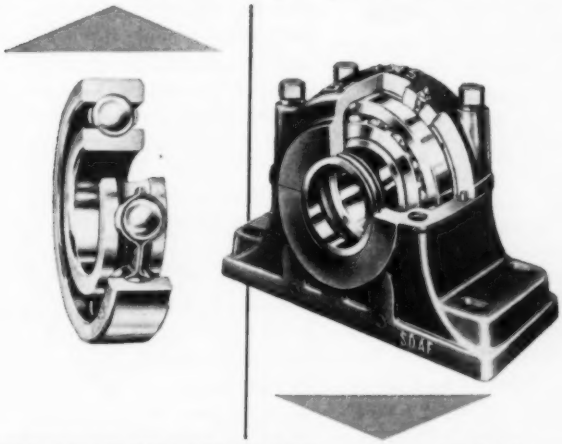
This pillow block can be mounted directly or with an adapter. Stabilizing rings are provided at no extra cost for applications where a "held" bearing is required to maintain shaft location. For heavy-duty applications, a cast steel housing (Type SAFS) is available. Shaft sizes from ¾" to 10½".

Only SKF can offer you unbiased bearing recommendations—because only SKF produces all four major types of anti-friction bearings: spherical, cylindrical, ball, and tapered roller bearings. For complete details on each type, just call the nearest of the twenty-four SKF sales offices.

SINGLE-ROW DEEP-GROOVE BALL BEARING

Here's a ball bearing that does two jobs, and does both of them well. It sustains heavy radial load as well as thrust load in either direction. Not only that, this bearing can be grease-lubricated when used at normal speeds and lubricated with oil at high speeds.

Yet this is a standard SKF bearing, mass-produced in various sizes at our automated Altoona (Pa.) plant. It's available in over 100 sizes ranging from over 5/8" O.D. to almost 16" O.D., and with various seal, shield and snap-ring combinations.



TYPE SDAF PILLOW BLOCK...with spherical roller bearings

Need an exceptionally sturdy pillow block? One that can withstand abnormal shock loads or heavy thrust loads day after day? Then specify SKF Type SDAF.

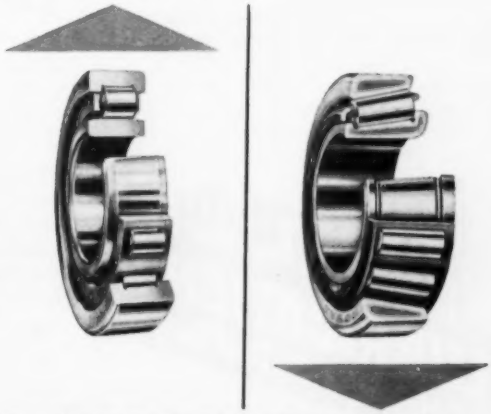
To provide maximum strength, four heavy bolts secure the cap of this pillow block to the base. Both halves are accurately aligned by dowel pins. And like the Type SAF, this pillow block comes equipped with Triple-Seal rotating rings that protect the bearing from foreign matter and retain the lubricant.

Type SDAF pillow blocks are made of cast iron but are also available in cast steel (specify Type SDAFS). They can also be mounted directly or with an adapter. Shaft sizes range from 2-11/16" to 14".

CYLINDRICAL ROLLER BEARING

Got a space problem? Here's a bearing that gives you high radial capacity—at very high speeds—in relatively small space. It's the SKF cylindrical roller bearing—which provides high radial capacity and minimum shaft friction. Controlled shaft end float within this bearing is a natural advantage of its design.

You can get prompt delivery in 154 bore sizes ranging from just under 1" to 6". Double-row cylindrical roller bearings are also available in bore sizes from 1" to 9.5".



Tyson® TAPERED ROLLER BEARINGS

What type of tapered roller bearing do you need: single-, double- or four-row? SKF's division, Tyson Bearing Company, makes all three of these types in a wide range of standard sizes.

The single-row type is especially suitable for carrying radial loads simultaneously. Double-row types are designed for use where the radial capacity of two single-row bearings is required. For special applications, the four-row type offers very high radial capacity in limited space.

All Tyson tapered roller bearings are interchangeable, size for size, with other makes of tapered roller bearings where the part numbers are the same.

5949

*REG. U. S. PAT. OFF.

Glen Canyon

(Concluded from page 145)

dale is about 165 miles, and the new cement plant got into production with the first of its two kilns in July, 1959. A detailed article describing the Clarkdale facility was published earlier this year.[2]

Allen R. Bacon is project manager for the Glen Canyon job, heading up the field force of Merritt-Chapman & Scott. L. F. Wiley is in charge of the project for the Bureau of Reclamation.

The 186-mile long Glen Canyon reservoir which will result from water backed up when the dam is finished, will extend upstream into Cataract Canyon in Utah and will cover an area of 162,700 acres. The power plant will have a capacity of 900,000 kilowatts. The dam structure, containing more than 5,000,000 cu. yd. of concrete, compares with Hoover Dam, which contains 3,250,000 cu. yd., and Grand Coulee, which required 10,500,000 cu. yd. It will be of the gravity-arch type and will rise 700 ft. above bedrock and 573 ft. above the normal level of the Colorado River.

A spectacular highway bridge was first constructed immediately downstream from the axis of the dam. A drive across the bridge, 1,200 ft. from rim to rim, takes less than a minute, observing the 20 m.p.h. speed limit.

Before the canyon was bridged, however, it involved a circuitous trip of 190 miles by road . . . and pretty rugged road at that!

[2]PIT AND QUARRY, February, 1960, pp. 90-95.

Pozzolans

(Concluded from page 136)

CIRCUIT IV—CONTROL FROM A PRODUCT-QUALITY COMPONENT

Controlling from end-product variations is always our goal, of course. It is apparent that there has been considerable neglect on the part of control engineers in their failure to design control systems with this basic goal in mind. If we are going to have automation in the mill room, considerably more thought will have to be spent along this approach. Circuit IV is here presented (in Figure 4) as a partial solution, as well as a challenge in this direction. Indications noted by the writer thus far have shown its feasibility with pozzolans, and it is being further checked for possible application to clinker-grinding circuits in cement manufacture.

Briefly, the equipment consists of a constant-speed, small-diameter, sealed screw which removes a constant volume sample of finished product from the classifier discharge and conveys it to a miniature high-efficiency mechanical air separator. This small unit is set at a finer particle size separation cutpoint than the large one from which it draws. The coarse fraction removed from the miniature machine (perhaps 50-micron size) flows continuously to a miniature vertical screw, also operating at constant speed.

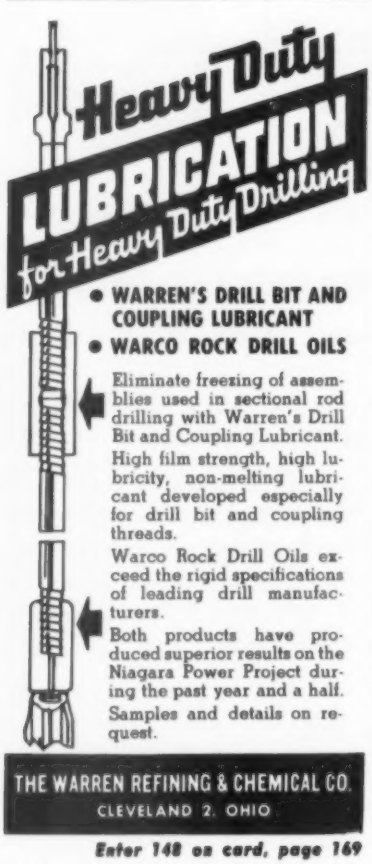
As the oversize fraction varies in amount due to variations in feed or grinding, the weight of the material lifted by the vertical screw varies slightly, and can thus be measured *via* ammeter on the screw motor. The latter, in turn, varies the fan speed or louver setting of the large classifier for product fineness adjustment. The change in classifier setting will, of course, also affect the flow of rejects in the recycle to the mill, this change being properly compensated for by the control circuit as in Figure 3. It should be apparent that the sampling control circuit is entirely independent of any throughput rate variations, since it evaluates only a small constant sample stream.

While it is true that a specific powder surface measurement would constitute a more ideal grinding system regulation, it would not be as readily applied as the method advocated by the writer, inasmuch as available equipment of laboratory size can be used for the miniature sampling-controlling system. It thus remains only to provide the usual mechanical air separator with a low-ratio, variable-speed drive or motorized louver regulation. Since this is already in vogue on some European machines, no major mechanical problems are involved.

SUMMARY

Pertinent factors in applied process control have been discussed, as well as automation in grinding regulation. In view of the fact that pozzolans cannot be controlled on a chemical compound basis by pre-adjustment and raw material blending, pozzolan processing must be provided with exacting controls, thus raising the control cost per ton of product in this industry. It follows that deposit uniformity is a primary pre-requisite for successful pozzolan manufacture.

Leavenworth Quarries at Leavenworth, Kans., reopened last October under the partnership of Myron Gilman and Frank Wenze. Present production from the underground limestone mine is 1,000 to 1,500 t.p.d. Several grades of material are produced. Al Larson is superintendent of operations.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• WARREN'S DRILL BIT AND COUPLING LUBRICANT
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Eliminate freezing of assemblies used in sectional rod drilling with Warren's Drill Bit and Coupling Lubricant.
High film strength, high lubricity, non-melting lubricant developed especially for drill bit and coupling threads.
Warco Rock Drill Oils exceed the rigid specifications of leading drill manufacturers.
Both products have produced superior results on the Niagara Power Project during the past year and a half.
Samples and details on request.
THE WARREN REFINING & CHEMICAL CO.
CLEVELAND 2, OHIO
Enter 148 on card, page 169

How short 180° turns boost pit output

When you maneuver Tournapull® Rear-Dumps under a shovel dipper or into restricted dump areas, waste time is practically zero. LW's *exclusive*, electric, kingpin power-steer lets these machines make fast non-stop 180° turns in less than their own length . . . in *only about 70% of length with bowl raised!*

There's no need for turntables or elaborate turn-around areas. And on the haul, you make hair-pin turns with complete safety, and save time while doing so. Time saved adds up to extra trips per shift, greater production . . . with *no increase in man-power or equipment investment.*

Simplicity reduces maintenance

The simplicity of Tournapull's turn-mechanism also cuts your maintenance expense. Steering involves only an electric motor, connected to a rugged ring-gear kingpin shaft. To activate the steer-motor of a C 'Pull* or "D", your operator moves an electric switch. A quick push to left or right turns the machine in the desired direction until the steering button is released. On the B 'Pull the same result is achieved with a short movement of the steering wheel. Turns are made quickly, regardless of footing. There are no fast-wearing parts to develop "play" in the steering mechanism, no cumbersome hydraulic jacks or other mechanism to limit turning ability.

Exceptional maneuverability is only one reason why LW Rear-Dumps haul more tons per hour at lower cost. To understand the true value of Tournapull haulers, it will be worth your while to see them in action. Available in three sizes: 11, 22, and 35 tons, 143 to 430 hp. Ask for full details and demonstration.

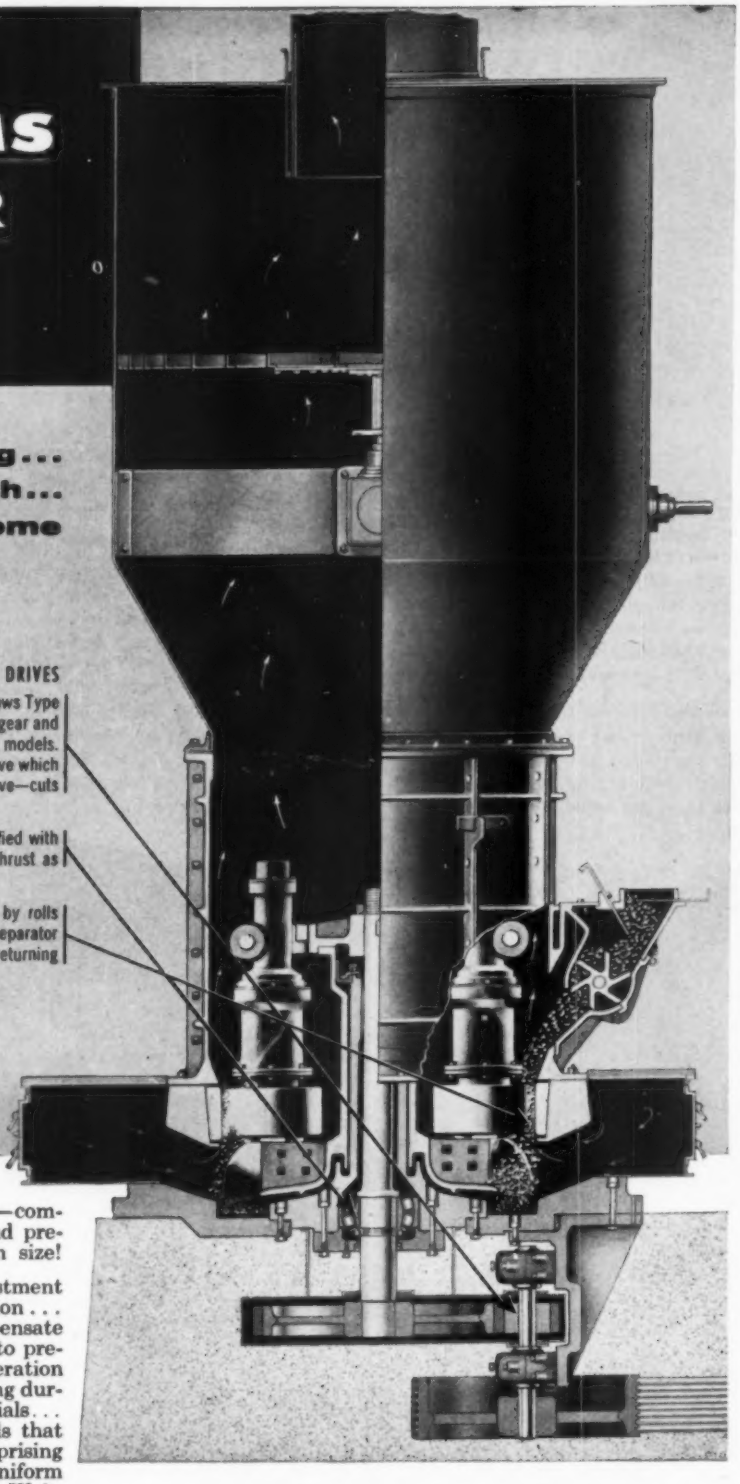
Just as it saves time in spotting for a load, LW Rear-Dump positions fast to save unloading time at hopper or dump. Says president of eastern quarry "Our 2 D Rear-Dumps get around the pit quick . . . turn fast in tight places . . . dump in a hurry. They really outmaneuver the hauler we used to have!" Adds operator, "I especially like the electric controls . . . this 'D' has all other haulers beat!" *Trademark DR-2203-MQJ-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

WILLIAMS ROLLER MILLS



- **Quality Fine Grinding... 20 Mesh To 400 Mesh... Micron Sizes On Some Materials**

EXCLUSIVE GEARLESS AND SPUR GEAR DRIVES

Another Williams advancement! Cutaway shows Type D Mill with Spinner Air Separator with spur gear and pinion drive used on Standard and larger models. Smaller sizes have simple gearless V-belt drive which is easier to maintain than bevel gear drive—cuts labor and downtime.

Bearing alignment of central shaft is simplified with only 2 bearings, the bottom one carrying thrust as well as radical load.

NOTE FLOW OF MATERIAL being ground by rolls rotating against bull ring, then air-swept to separator which discharges finished product while returning coarse tailings for regrinding.

From raw material to finished product—completely automatic grinding, blending and precision classifying to 20 mesh or micron size!

Self-adjusting feed rate . . . instant adjustment for sizing, even while mill is in motion . . . continuous automatic take-up to compensate for wear . . . constant rising air current to prevent build-up of fines and inefficient operation . . . automatically controlled hot-air drying during grinding of moisture-carrying materials . . . all are features of Williams Roller Mills that virtually guarantee increased output, surprising cost reductions and exceptionally high uniform quality. Get all the facts immediately . . . *Write today for catalog.*

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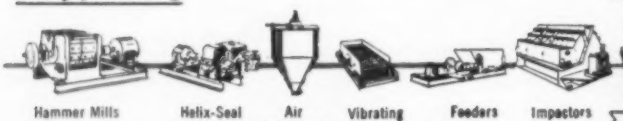


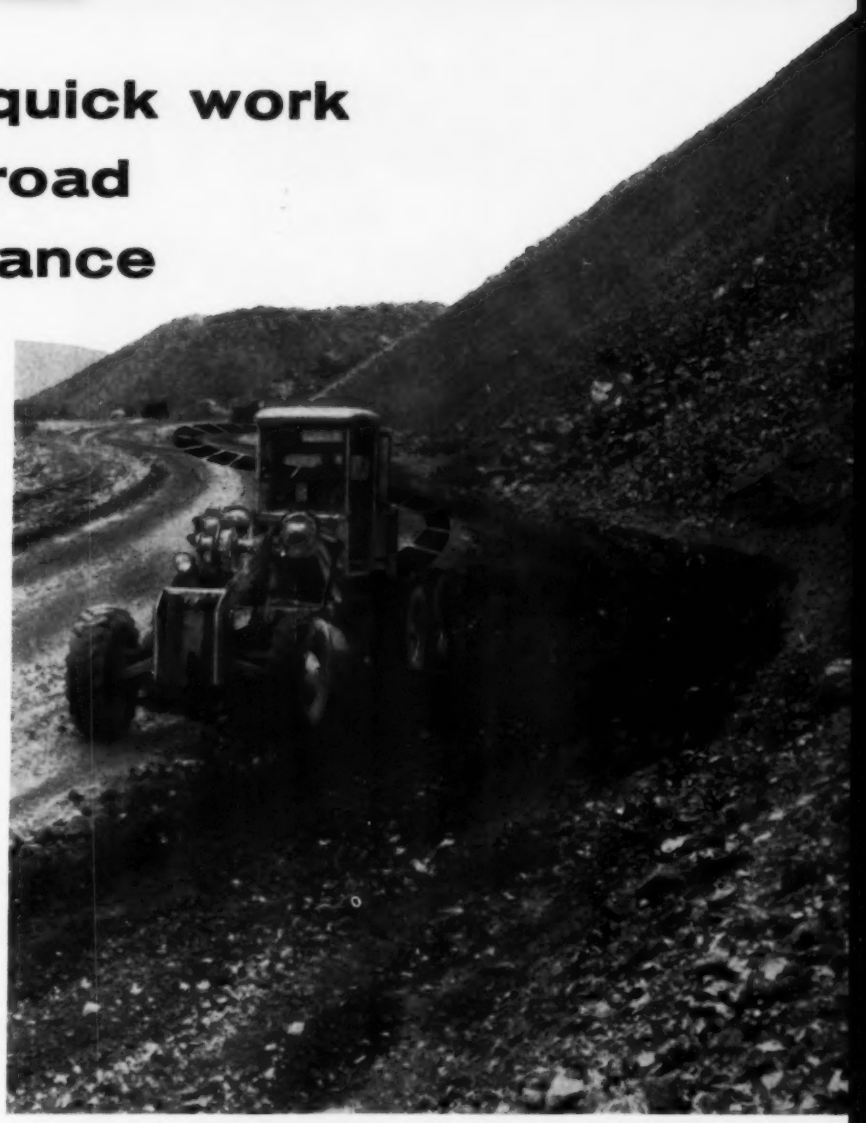
WILLIAMS

CRUSHERS GRINDERS SHREDDERS

Oldest and Largest Manufacturers of Hammer Mills in the World

Enter 151 on card, page 169 →

Makes quick work of haul-road maintenance



Powerful L-W Adams 660 — at large open-pit mine in Arizona — patrols busy haul roads 24 hr a day, 6 days a week. Grader goes wherever needed (at speeds to 26 mph) to fill ruts, level washboard, clear debris dropped by overloaded haulers and improve drainage.

You know from experience that using the *right* tool on any job completes the work faster and easier. The same holds true when maintaining your haul roads, pit floor, dump areas around crusher, and stockpiles, or waste dump. Use a heavy-duty L-W Adams† grader for these maintenance assignments. You'll find you can complete this work *faster* and *at lower cost.*

Greater work range

All LeTourneau-Westinghouse 85, 115, 123, and 160 hp Adams graders have constant-mesh transmission as standard, with 8 forward and 4 reverse speeds. In addition, 3 optional creeper speeds provide extra lugging power for turning up rocky subsurfaces and for greater grading accuracy. Choice of 15 gear ratios give you the balance of power and speed to handle every grading job . . . in any material . . . at top efficiency.

Smooth, accurate control

Adams' blade mechanism is firmly mounted on a heavy-duty circle for chatter-free operation. Strong T-shaped drawbar gives L-W grader firm circle support for accurate blading in any material.

Blade positioning is fast . . . it swings maximum arc from deep ditch-cut to high bank-cut in less than a minute. Moldboard turns 360° — clockwise or counter clockwise — provides quick change from any forward work position, to desired angle for reverse ditching and grading.

Low operating costs

All gears operate on anti-friction bearings — for less wear, easier operation. Automatic braking on transmission, when hydraulic brakes are applied to wheels, gives safer operation and less maintenance. And because L-W power-control clutches shift on ball bearings, you have easier, smoother, safer controls . . . assuring accuracy, speed, and performance with minimum upkeep.

Keeps busy all year

Between regular assignments, your LeTourneau-Westinghouse grader need not sit idle. With available attachments, such as Jebco Elegrader, bulldozer blade, scarifier, snow plow and wing, you can keep this grader busy on your property the year round. Also, grader's high travel speeds (to 26 mph) permit the profitable handling of jobs for adjoining pits. There are 6 models available — 85 to 190 hp. Your choice of GM or Cummins engines on all LW graders. The 190 and 145-hp POWER-*Flow*® models have torque-converter drive . . . will do more work faster than any other graders on the market. Call or write for a demonstration today!

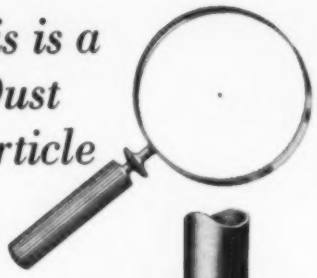
†Trademark G-1874-MQ-1

LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

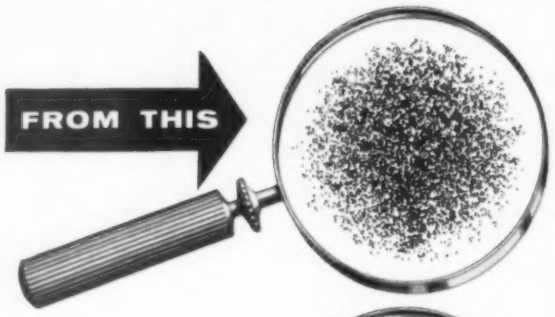
Where quality is a habit

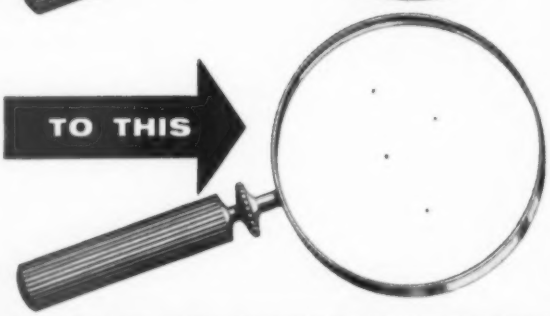
This is a Dust Particle



This is a Cyclo-trell Dust Collector →

The Cyclo-trell Dust Collector Cleans Gas with these Dust Particles...





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This is a fact. If you have a process or cleaning problem in steel mills, refineries, paper, cement or chemical plants, call on Research-Cottrell. • We will be glad to consult with you on your specific dust collection problems, and place at your disposal the largest research and engineering facilities.

For further information, write for Bulletin 300 which describes several applications in detail.

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RC-300

"We tried several big haulers... and the 65 Payhauler® tops 'em all!"

—New Hope Crushed Stone & Lime Co., New Hope, Pa.

New Hope's "65's" speed full 19-ton loads of dolomite from quarry to 300-ton-per-hr. capacity crusher—with a maximum climb-out grade of 16% and an 800-ft. haul! The 250-hp "65" travels up to 36 mph.; the 375-hp "95" up to 38 mph.!

"Before buying two International® 65 Payhauler trucks, we had demonstrations by several large haulers," reports Edgar N. Putnam, for New Hope Crushed Stone & Lime Co.

"The '65' topped them all for production, ease of operation, and all-around efficiency. Main '65' features are ample power, balance for full-load delivery, and genuine operating ease and safety."

Both the 19-ton 65, and 27-ton 95 Payhauler trucks have the strength-multiplying International corrugated body design—that sheds weight, increases capacity. The direct-start International "817" engine super-powers both "65" and "95"—to outspeed former models, up to 40%. And both "65" and "95" highball full loads safely with reserve-area braking and new course-holding power-steering!

Compare—prove on the job that Payhauler gives you top off-road capacity; top power-to-weight ratio; top profit-earning ability! Let your International Construction Equipment Distributor demonstrate!

Get 11-second Payhauler dumping with exclusive inverted hoist body-positioning. Positive up-and-down snubbing control prevents machine-mauling dumping impact!

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Construction Equipment

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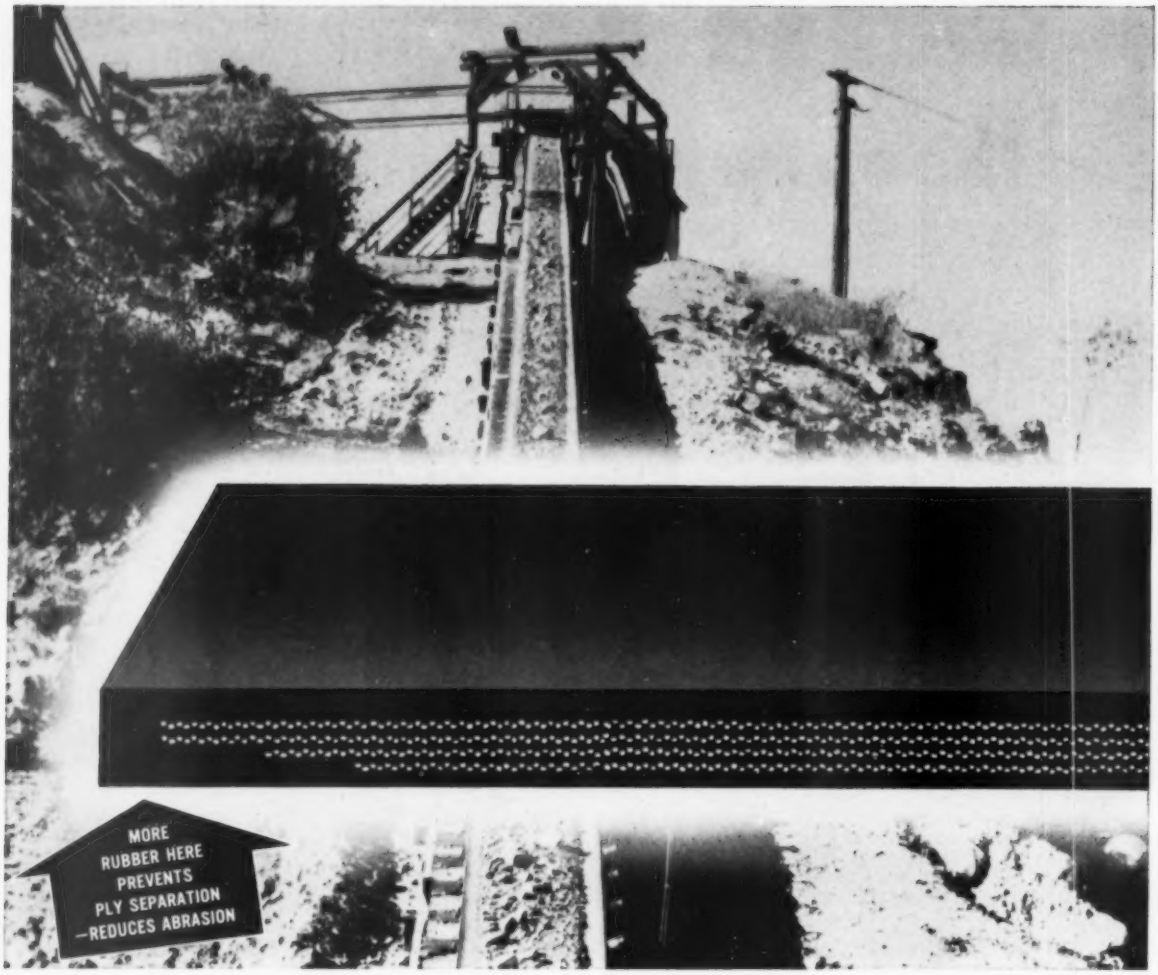

EXCLUSIVE "COLEDGE"* CONSTRUCTION

gives Quaker Thermoid Conveyor Belting extra life where it counts

Unique "Coledge" construction puts more rubber *at the edges* where it's needed, prevents ply separation, makes a more flexible and wear resistant edge where abrasion is greatest. Punishment at the edges—especially the tough use dealt out in quarrying—can kill most conveyor belting in a fraction of the lifetime of Thermoid-Quaker belting.

Tests show Thermoid-Quaker "Coledge" construction lasts and lasts on the same jobs where other belting fails. "Coledge" construction is available on all grades of Thermoid-Quaker belting.

What's more, all Thermoid-Quaker conveyor belting is prestressed in manufacture, so that the belt is actually in compression when you get it—ready for the heaviest load without strain.

Examine Thermoid-Quaker Belting with the exclusive "Coledge" construction at your Thermoid distributor's, or write for further information to Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Streets, Philadelphia 24, Pa.

*Patent Applied For

THERMOID DIVISION PORTER H.K.PORTER COMPANY, INC.

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

Motor, gears, all moving parts integrally designed in a compact, efficient, *one-piece* conveyor drive, to give you all these advantages:

- No space wasted on overhead V-belt set-ups. No maintenance catwalks.
- No power lost, because there's no transfer of power from external drives.
- No time spent on V-belt maintenance. Completely enclosed motor with sealed bearings cuts all service to a minimum.
- No layout problems—easy installation.

SAFE
Bauer Self-driven Head Pulley eliminates all hazards due to exposed chains, sprockets, etc., and eliminates the need for space-consuming and time-consuming safety measures.

PROVED
From ¼ to 25 H.P. in all standard widths, Bauer Self-driven Head Pulleys are moving raw materials, products of light and heavy industries, agricultural produce and packaged goods throughout the world. Service and parts are readily available in the U.S.

Ask your conveyor system manufacturer, or write for literature or dealership information to:

ALSO AVAILABLE
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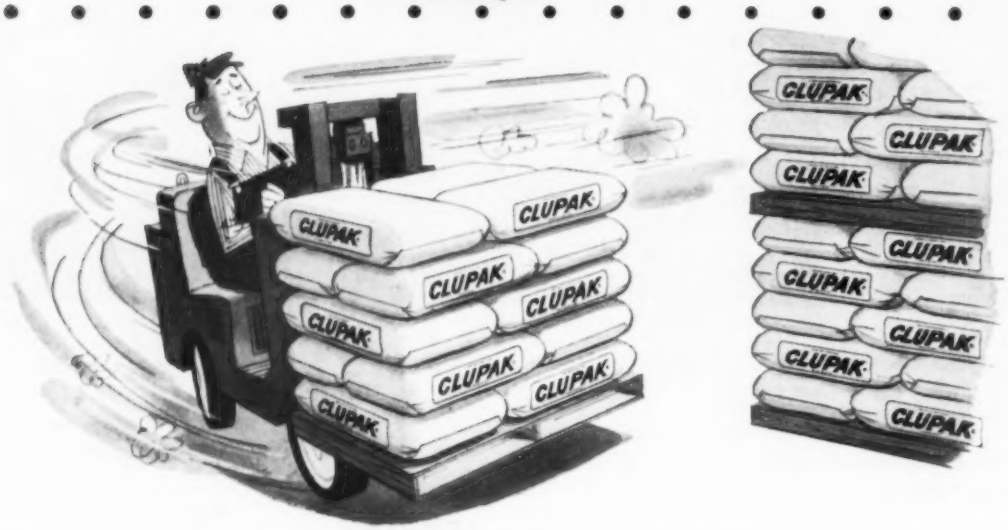
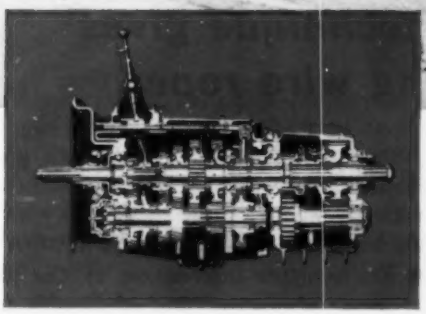


NEW, TOUGHER KRAFT SOLVES BREAKAGE PROBLEMS

New CLUPAK extensible paper offers multiwall buyers a happy choice . . . Because CLUPAK extensible paper has a patented, built-in stretch and "give," it simply absorbs most shocks and strains that rip, split or tear conventional kraft. By specifying CLUPAK extensible paper in your kraft bags, you solve your breakage problems once and for all. And multiwalls of CLUPAK extensible paper fill faster, palletize better and handle easier.

Millions of these new multiwalls have proved the advantage of this tougher, stronger paper. Plan a trial shipment of multiwalls, made of CLUPAK extensible paper, as part of your next bag order. Use the CLUPAK trademark when ordering and look for it on the bags. Only then can you be sure the bag paper meets the rigid strength specifications established by Clupak, Inc. for your benefit.

*Clupak, Inc's. trademark for extensible paper manufactured under its authority and satisfying its specifications. Clupak, Inc., 530 5th Ave., N. Y. 36, N. Y.



Wells Overseas, Ltd., an associated company of Wells Cargo, Inc., Reno, Nevada, is using 16 KW-Dart 802-AT Tractors equipped with Fuller R-1160 ROADRANGER Transmissions in iron mining operations 250 miles south of Lima, Peru.

Geared with
FULLER ROADRANGERS

...91-TON LOADS

with double bottoms...

Featuring 9-speed Fuller R-1160 ROADRANGER Transmissions, 16 KW-Dart 802-AT Tractors handle up to 91 tons of iron ore at a time on a mining operation in Peru.

Owned by Wells Overseas, Ltd., the 320 hp KW-Darts use the single-stick, semi-automatic ROADRANGERS to provide maximum performance on the cross-country haul from crusher to the seaport of San Juan. Because the diesel engines can operate in the peak torque and hp range at all times, the 72-mile round trip is made in 3½ hours, including time for loading and unloading.

Ask about the Fuller Transmission designed to boost *your* profits.

STANDARD EQUIPMENT
on Fuller Off-Highway Transmissions

- **COUNTERSHAFT INERTIA BRAKE** . . . for quick, easy upshifts without double clutching . . . faster work cycles
- **PRESSURE LUBRICATION and FILTRATION SYSTEM** . . . for longer gear and bearing life . . . greater availability, less maintenance

FULLER — *TRANSMISSION DIVISION*
MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN
Subsidiary EATON Manufacturing Company

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla. Automotive Products Company, Ltd., Brock House, Langham Street, London W.1, England, European Representative

Advance Progress Report

CF&I-Wickwire develops DOUBLE

New wire drawing technique gives you longer-lasting wire rope

CF&I-Wickwire's premium wire rope – Double Gray – has now been improved by a remarkable new wire drawing technique. This new wire rope – Double Gray-X – provides EXTRA LONG LIFE.

Wickwire's advanced wire drawing process is the joint effort of our research engineers, metallurgists and key production people. They sought to reduce the friction between the wires within the rope itself, thus producing a wire rope with greater resistance to bending fatigue. An important step in Wickwire's new wire drawing process is the use of *molybdenum disulphide.*

"Moly Disulphide" builds a thin, permanent molecular shield around each wire. Coupled with Wickwire's other advanced wire processing techniques, it gives these results:

- *Friction-free interaction of the individual wires in every strand of Double Gray-X* – A molecular jacket of Moly Disulphide on each wire helps cushion them against the effects of bending, crushing and abrasion. As the rope operates over sheaves, for example, the molecular shield tends to prevent the wire surfaces from grinding against each other, reducing friction and wear.

a superior wire rope

GRAY-X

- *Smoother surface to the wires*—In any wire, tiny imperfections occasionally form on the surface. These "weak links" can cause premature breaking of the wires and impair the life of the rope. Moly Disulphide helps eliminate any minute nicks, creating smoother-surfaced wires.

  Higher degree of toughness which is essential to longer wire rope life—Moly Disulphide greatly minimizes the friction involved in the drawing operation, thus preventing the wires from "heating up". This assures the correct physical properties for every wire in Double Gray-X and helps the wire retain its original toughness.

Double Gray-X will be made in a wide range of sizes and constructions to give greater operating economy and reduced downtime for all types of rope-using equipment. It will be available soon from CF&I-Wickwire's chain of warehouses and through a network of nationwide distributors.

EXTRA STRENGTH

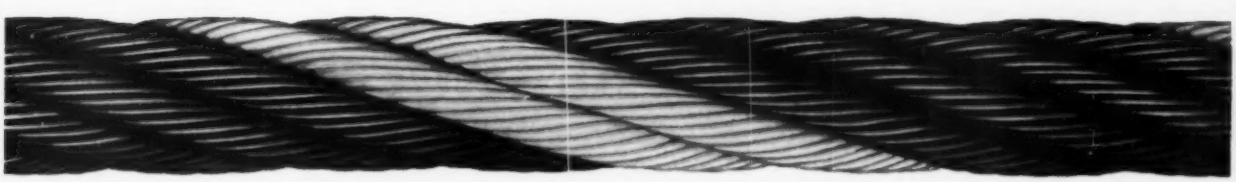
In addition to longer life, Double Gray-X gives you the extra strength of Double Gray Wire Rope. Made of extra improved plow steel with an Independent Wire Rope Core, this rope gives 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.

7484

WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa (Tex.) • Oklahoma City Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita
In the East: **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) New Orleans • New York • Philadelphia



SYNTRON cost-reducing equipment of proven dependability

for efficient high capacity screening

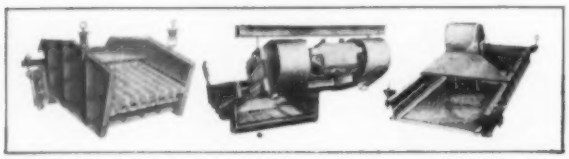
SYNTRON VIBRATING SCREENS

SYNTRON builds a vibrating screen for almost every screening need.

SYNTRON Vibrating Screens have been tested and proven in many sand and aggregate processing applications—sizing, dewatering, media recovery, wet and dry sizing and fine screening. Uniform quality control screening means consistently high quality products.

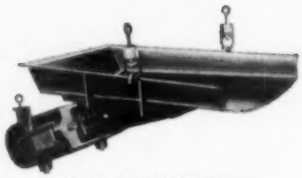
SYNTRON Screens offer efficiency, dependability and low maintenance for better screening, higher capacity at lower cost.

Other SYNTRON Vibrating Screens

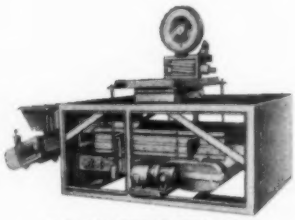


Write for the catalog section on Vibrating Screens

Other *SYNTRON* Equipment of proven dependable Quality

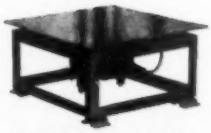


VIBRATORY FEEDERS



GRAVIMETRIC FEEDERS

ROTARY VIBRATOR CAR SHAKERS



VIBRATORY PACKERS

TEST SIEVE SHAKERS

SYNTRON COMPANY

385 Carson Ave. *Quality Equipment Since 1921* Homer City, Penna.

Sales offices in principal cities in the United States and Canada—Agents in most Foreign countries

in heavy-duty compressors

these EXTRA-VALUE FEATURES mean top performance and economy

AIR-CUSHIONED CHANNEL VALVES

Highest efficiency • Exceptional durability • Quiet operation

FULL-FLOATING ALUMINUM BEARINGS

Roll with the punch of each stroke to distribute load

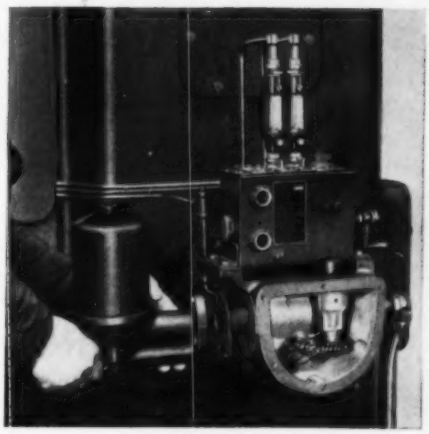
FULL FORCE-FEED LUBRICATION

Filtered oil under pressure to all bearing surfaces

SEALED FRAME

Keeps dirt out • Keeps oil in
Keeps wear down

take FULL FORCE-FEED LUBRICATION for example...



a continuous flow of filtered oil under pressure to all bearing surfaces without operator attention

In Ingersoll-Rand heavy-duty compressors, running parts are continuously lubricated by filtered oil under pressure from a crankshaft-driven pump. All crankshafts and connecting rods have rifle-drilled oil passages, so internal lubrication piping is virtually eliminated. All systems have filters which keep the oil clean and free of impurities. Compressor cylinders receive special oil from separate systems.

This constant flow of oil over all working parts keeps wear to a minimum. In I-R compressors, since the frames are completely sealed, no dirt gets into the oil to cause wear; also, no oil gets out.

Full, filtered force-feed lubrication is only one of the quality features which have earned the Ingersoll-Rand heavy-duty compressor line its reputation for excellence. For more information on compressors of all types and sizes from ½ to 7500 hp, for pressures to 35,000 psi and vacuums, call your I-R representative today.

ESH
20 to 150 hp.

PHE
75 and 100 hp.

XLE
125 to 350 hp.

PRE
400 to 2000 hp.

XPV
(Steam-driven)
200 to 1500 hp.

Ingersoll-Rand

1-889 11 Broadway, New York 4, N. Y.

COMPRESSORS • GAS & DIESEL ENGINES • PUMPS • AIR & ELECTRIC TOOLS • CONDENSERS • VACUUM EQUIPMENT • ROCK DRILLS

More proof that...

AMSCO HELPS YOU MOVE MORE TONS PER DOLLAR

How AMSCO screen parts and Simplex 2-Part Dipper Teeth are giving users greatly improved service life*

AT A LARGE* NEW ENGLAND QUARRY

AMSCO CHUTE PLATES LAST 5 YEARS VS. 4 WEEKS FOR PREVIOUS TYPE

In the screen house of this quarry, two Amsco HC-250 abrasion-resistant chute plates are used on each Hi-G discharge screen. 500 tons per hour pass over each plate, during the two-shift, 20-hour operating day.

This installation resulted from a previous test, in which a set of Amsco plates was compared with regular carbon steel plates. The Amsco Chute Plates *lasted about 5 years*, whereas the competitive plates had to be replaced every 4 weeks.

The quarry operator reports that the Amsco plates presently installed are holding up excellently in service. Their exceptionally long life and trouble-free service means big dollar savings—through elimination of costly shutdown time.

ON THE NIAGARA POWER PROJECT

AMSCO SIMPLEX 2-PART TEETH DIG 40,000 YARDS OF ROCK BEFORE REPLACEMENT

At the right, you see the type of rugged rock excavation in which this outstanding service record was set. It's part of the Niagara Power Project—Conduit #2 South—being handled by Gull & Defelice Construction Company.

All dippers on the job are equipped with Amsco Simplex 2-Part Reversible Teeth. They operate 16 hours a day, 6 days a week—*handle approximately 40,000 yards of rock*—before tooth replacement is required.

In addition to their exceptionally long wear, the fact that Simplex Teeth *can be replaced in ten minutes with no trouble* is an important advantage to the operators. It all adds up to big savings—in replacement cost and shovel downtime.

*Patent No. 2,904,908

Wherever high impact and abrasion are problems, you'll "move more tons per dollar" with Amsco Dippers, Dipper Teeth and Crusher Parts. See your equipment dealer, or write us direct for technical bulletins.

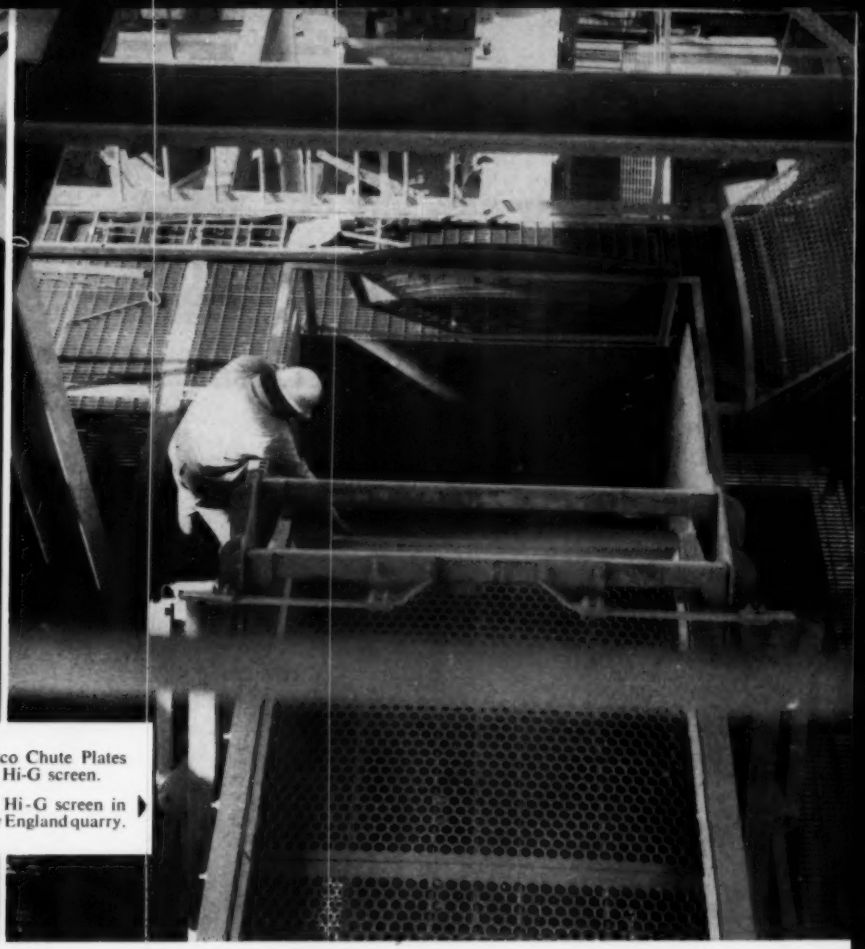
AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

AMERICAN Brake Shoe COMPANY

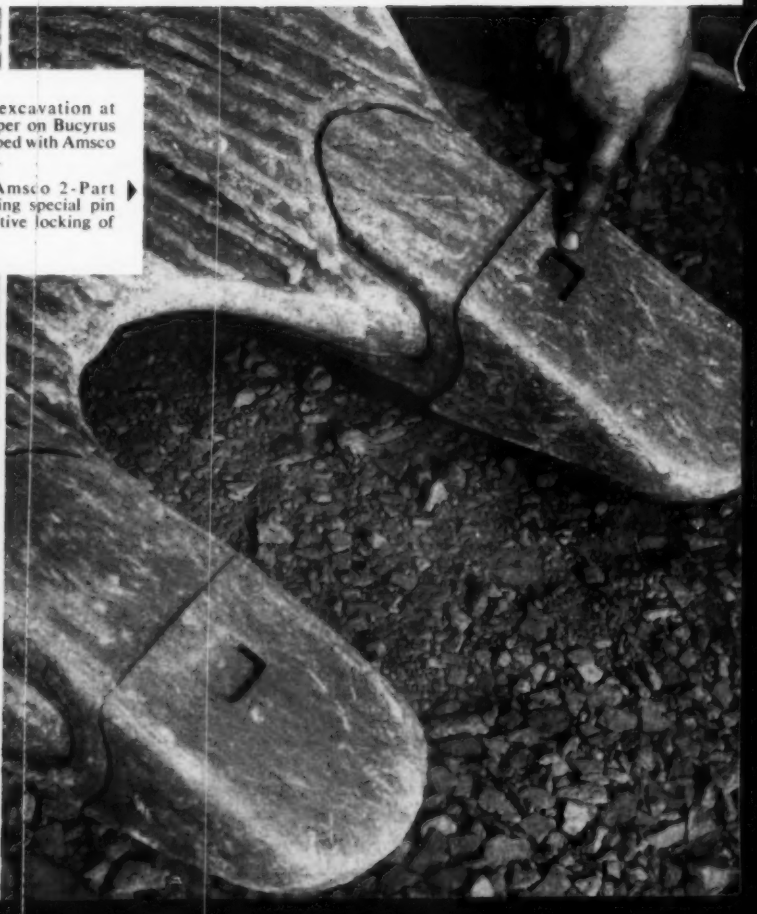
Other plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis
In Canada: Joliette Steel and Manitoba Steel Foundry Divisions

Enter 162 on card, page 169



Left: Close-up of Amsco Chute Plates used on each discharge Hi-G screen.

Right: General view of Hi-G screen in screen house of large New England quarry.

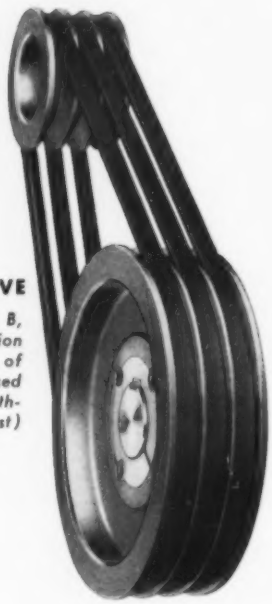


Left: General view of excavation at Conduit #2 South. Dipper on Bucyrus Erie 88B shovel is equipped with Amsco 2-Part Reversible Teeth.

Right: Close-up of Amsco 2-Part Reversible Teeth, showing special pin lock which assures positive locking of the reversible tip.

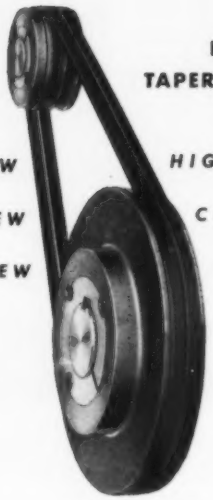
an entirely new line of V-Belt Drives . . . . .

DODGE Dyna V



BIG-GROOVE TAPER-LOCK DRIVE

(— using standard A, B, C, D and E cross section belts, the hp ratings of which have been increased an average of 40% without any increase in cost)



DYNA-V TAPER-LOCK DRIVE

NEW HIGH CAPACITY

NEW COMPACTNESS

NEW SAVINGS IN COST

COMPARISON, ILLUSTRATED ABOVE — 3 HP, 1750 RPM, 2.41 TO 1 RATIO

	BELTS		SHEAVES			CENTER DISTANCE	HP	WEIGHT (LBS.)	COST	
	Number	Size	O.D. Driver	O.D. Driven	Width				Per hp	Per Drive
BIG-GROOVE TAPER-LOCK DRIVE	3	A42	4.15"	8.95"	2½"	12.3"	4.62	24.7	$5.62	$25.98
DYNA-V TAPER-LOCK DRIVE	2	3V400	3.35"	8.00"	1$\frac{3}{32}$"	10.8"	5.0	18.0	$4.50	$22.50
% SAVING *Savings vary with different sized drives*			**19%**	**10%**	**56%**	**12%**	+	**27%**	**19.9%**	**13.4%**

Dyna-V Drives are sensationally compact. They are capable of handling up to three times as much horsepower in a given space. Dyna-V opens vast new possibilities for better, more economical machine design. And, in most instances, *Dyna-V costs less!*

Narrower grooves, to match stronger, narrower Dyna-V Belts, greatly reduce the face width and the weight of Dyna-V Sheaves. Cost is lowered. Smaller diameter sheaves and shorter center distances multiply savings.

Dyna-V Sheaves decrease shaft overhang—increase bearing life. The new dimensional stability of Dyna-V Belts solves the problem of belt matching. Every belt carries its full share of the load.

Dyna-V Drives are available for capacities from 1 to 1500 hp. Ask your Dodge Distributor. Or write us for new Dyna-V Bulletin.

DODGE MANUFACTURING CORPORATION, 4000 Union St., Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the *white* pages of your telephone directory, or in the yellow pages under "Power Transmission Machinery".

After 20,000 hours of trouble-free power "Old Faithful" retired by new UDT-817!

An International UD-24 engine—called "Old Faithful" by her owners—has racked up 20,000 hours of continuous trouble-free performance on a rock crushing job in Kansas. That's an average of nine hours per day for six years! At 13,000 hours a gasket had to be replaced, but there have been no major repairs. The operation, owned by Roy Baker of Valley Falls, produces 900 cu. yds. of crushed rock daily with a 32 x 40 Universal crusher.

Partners in the company, Mike and Bert Baker, say, "We decided to retire our old faithful UD-24 after it had piled up nearly 20,000 trouble-free, hard-working crushing hours. The new UDT-817 was chosen because of its greater power, direct starting and easy installation. Fuel consumption on the 817 is low, considering the power we get. And with all that power we can eliminate secondary crushing by just reducing the jaw opening."

Roy Baker says, "Of course I bought another International!" And that about sums up the attitude of contractors all over the country—they know from experience that Internationals stand up under heaviest work, are immune to dust and grit—and will pay back the investment faster than any other.

Check with your International Engine Distributor or Dealer soon, and find out how little it costs to power —or repower—your equipment with International engines. See the full line of engines and power units—16.8 to 385 max. hp.

INTERNATIONAL®
ENGINES

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

Administrative and Production Executives!

Here's how to reserve your Personal Copy of the

52nd (1960) Edition

PIT AND QUARRY HANDBOOK

New material has been added . . . revisions made . . . every chapter carefully reviewed for accuracy and up-to-date information.

The PIT AND QUARRY HANDBOOK contains complete information on every operation in the pit and quarry industries, as well as complete information on the equipment used in these industries, both in the editorial and advertising pages.

Initial distribution is reserved for administrative and production executives in plants producing portland cement, sand and gravel, crushed stone, agricultural limestone, lime, gypsum and slag.

If you are in this category you can get a copy of the 1960 PIT AND QUARRY HANDBOOK simply by writing the publisher on your letterhead giving the following information: name, title, company affiliation, address, products produced, and chief duties.

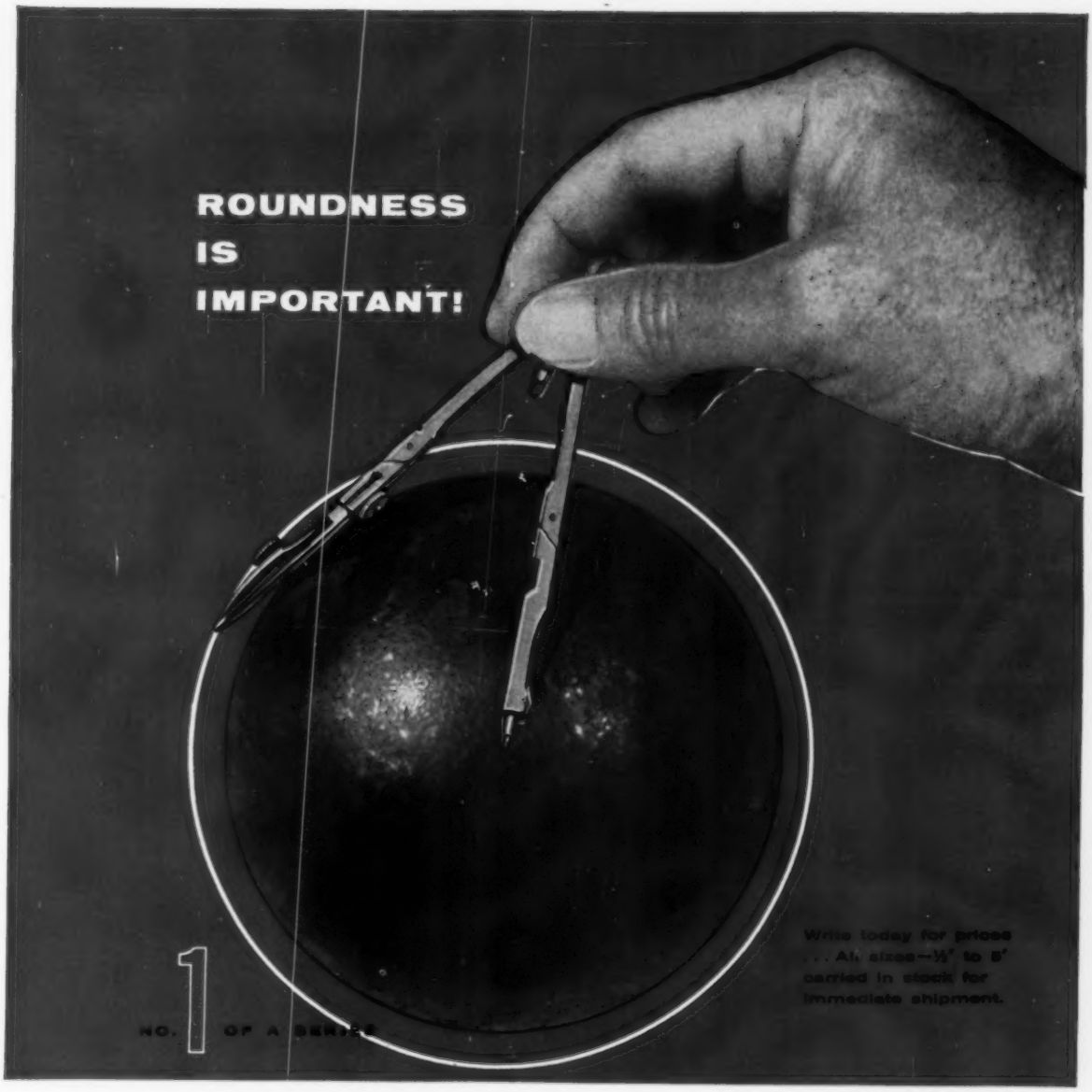
Although every effort will be made to fill all requests, the publisher reserves the right to limit distribution. Please use a separate letterhead for each individual request. Requests received by May 15 will be given preference.

Send all requests to:

PIT AND QUARRY HANDBOOK

431 South Dearborn Street

Chicago 5, Illinois



The more perfectly round a grinding ball is the better it grinds and the longer it lasts—deviations reduce its efficiency. Coates has established a reputation for the roundness of its Carbex Triple-Forged Grinding Balls which dates back to 1918 when they patented a process for the first round grinding ball. Great care and skill are employed in the manufacture of these superior products. More perfect sphericity assures you a ball that wears evenly and grinds better, longer. Continued checks and calibrations throughout the manufacturing process protect the high standards and assure uniformity.

Coates Carbex Grinding Balls are made of fine-grained, high-carbon steel. Scientifically heat treated to the core, they are hard, to last longer and to grind better; tough, to avoid shattering under stress of milling. Call for Coates Triple-Forged Carbex Grinding Balls . . . built with care for longer wear.

COATES STEEL PRODUCTS CO. CARBEX TRIPLE-FORGED BALLS

C697-3

COATES STEEL PRODUCTS COMPANY

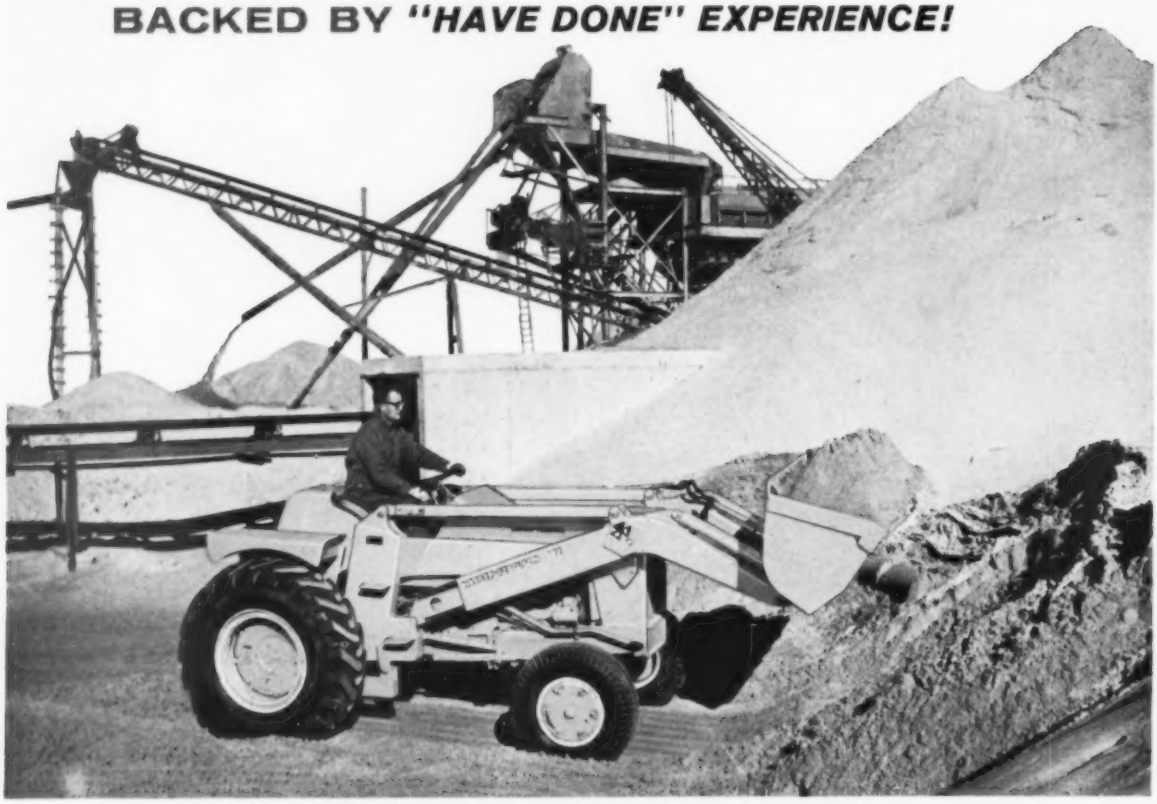
GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA

HERE'S REAL

"CAN DO" PERFORMANCE

BACKED BY "HAVE DONE" EXPERIENCE!



the MASSEY-FERGUSON 406

featuring INSTANT REVERSE

In loading and stockpiling operations you want a machine that

— is fast
— gets full loads
— doesn't waste time between dump and load
— can be used for a multitude of jobs
— permits excellent visibility
— is reasonable in cost.

To all these requirements, the Massey-Ferguson 406 says "Can Do."

It cycles fast between load and dump because of Instant Reverse that lets you press a pedal to change direction of travel without shifting or clutching. And, it has the same speed in reverse as in going forward.

Full loads are easy with direct line thrust from hinge point to bucket tip, 36° rollback at ground and 50° at 3-feet carry.

The operator's control zone is centrally located to permit unequalled visibility to the front, rear, and both sides.

The 406 is versatile. It handles big jobs with speed, but also completes the small jobs economically. A full range of matched attachments are available.

Compare it for performance, cost, and versatility against anything in its class. You'll see why it says "Can Do." Ask your Massey-Ferguson Industrial Dealer to show you his complete line of M-F Industrial equipment now.

Why Wait? — Set a Date — We'll Demonstrate!

MASSEY-FERGUSON INDUSTRIAL DIVISION
Block 1000 South West St., Wichita 13, Kansas
Producing Sizeable Power for the "Sensational 60's"

MF60-23

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

HYDRAULIC DREDGES, manufactured by Meckum Engineering, Incorporated, Chicago, Ill., are pictured and described in Bulletin No. 400. The units reportedly reclaim and handle water-bound solids at low cost and with ease of operation. The dredges dig, eliminate oversize, and convey and deposit the material from pond to plant in one operation. In addition to complete dredges, individual components are available to complement the present equipment of users. **(301)**

"FITTING A WHEEL-TYPE LOADER TO JOB NEEDS," a 9-page report by Caterpillar Tractor Company, examines the factors to consider and weigh when buying a wheel-type loader. Productive ability of each loader, purchase price in relation to machine quality, and such considerations as parts and service availability and trade-in value are evaluated. Several pages are given to tables that compare bucket reach, height, hp. rating, and weight, as well as price. **(302)**

QUARRY CASE HISTORIES—DRILLING AND BLAST METHODS, a pamphlet available from American Cyanamid Company, New York, N. Y., tabulates the ratio of spacing to burden in the operation of rotary drills or heavy-duty wagon drills. The requirements for blasting or drilling limestone, dolomite, granite, sandstone, quartzite, and related formations are listed in table form. **(303)**

THE S-E-CO. GRAVIMETRIC FEEDER, designed by Stock Equipment Company, Cleveland, Ohio, to feed coal by weight, instead of by volume, to pulverized-fuel and cyclone-fired boilers, is described in a bulletin issued by the company. Photographs and diagrams explain the operation of the unit. **(304)**

ELECTRICALLY HEATED SCREENS to use when moisture causes clogging and other vibratory screening difficulties are described in an illustrated leaflet on the "Converta-Screen," manufactured by Screen Heating Transformers Incorporated, Massillon, Ohio. **(305)**

DUAL ROTOR IMPACT BREAKERS, newly developed by Kennedy Van Saun Manufacturing & Engineering Corporation, Danville, Pa., are described in a pamphlet that provides tables, photos, and diagrams. The units are designed to handle non-abrasive quarry rock and similar materials when a high ratio of reduction and a high capacity of cubical product at low production cost are important. **(306)**

THE MATCHED JAW CRUSHER offered by Universal Engineering Corporation, Cedar Rapids, Iowa, is described in Specifications Sheet #133-601. Pictures, tables, diagrams—all describe the production capacity and operating principles of the two matched moving jaws unit. **(307)**

INTERNATIONAL HARVESTER'S TRUCKS AND TRACTORS. are described in three different pamphlets. The 230 series of off-highway trucks include diesel, gasoline, and LPG engines for heavy hauling jobs. The R-line takes in the conventional 4- and 6-wheel heavy duty trucks for highway use. There is the same assortment of engines as noted above. The T-340 crawler tractor is covered in a 4-page specification sheet which lists capacities and describes performance. **(308)**

ELECTROMAGNETIC AND CERAMIC type magnetic pulleys are presented in Catalog C-2000, issued by Dings Magnetic Separator Company, Milwaukee, Wis. The factors in selecting the non-electric ceramic-type pulleys or the electromagnetic all-welded aluminum-wound pulleys are evaluated. Graphs, diagrams, and tables further explain the information supplied. **(309)**

THE AMPLITROL FEEDER, made by Carrier Conveyor Corporation, Louisville, Ky., is described in a 12-page illustrated brochure. Also described in the company's packaged installation, which includes feeder, hopper bottom, gate supports, and isolation springs and suspension mounting. **(310)**

APRIL ***PIT AND QUARRY*** ***1960***

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

VOID AFTER 60 DAYS.

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more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

GEAR MOTORS AND SEPARATE MOTOR REDUCERS are described, with pictures and diagrams, in an 8-page bulletin giving the features of the Slo-Speed gear motors and Slo-Speed separate motor reducers. The bulletin is available from Sterling Electric Motors, Incorporated, Los Angeles, Calif. A good cutaway diagram illustrates the double reduction principle of the speed reduction unit. (311)

CONSTRUCTION MACHINERY is listed in four pieces of literature released by Allis-Chalmers Manufacturing Company, Construction Machinery Division, Milwaukee, Wis. Catalog MS-1357 introduces the recently introduced 340 hp. 30-cu. yd. (heaped) TS-360 motor scraper. A 4-page folder UT-116, describes the D-10 and D-12 utility tractors. MS-1319 is a 16-page catalog presenting the Model D motor grader. MS-1322, an 8-page catalog, highlights the features of the TS-160 motor scraper, which has 155 hp., 9½ cu. yd. capacity (heaped). Specify which catalogs you wish when listing this number on the card on this page. (312)

HYDRAULIC RAMS AND INDEPENDENT PUMPS are detailed in an illustrated, 8-page catalog of Duff-Norton Company, Pittsburgh, Pa. Rams, in capacities ranging from 10 to 100 tons, with attachments and accessories, and two hand pumps, and three power pumps are described. Tables, including one showing how a series of rams can be actuated by one pump, are included in the pamphlet. (313)

CENTRALIZED LUBRICATION SYSTEMS are illustrated and explained in a 24-page booklet from the Farval Division, Eaton Manufacturing Company, Cleveland, Ohio. (314)

FOUR MACHINES IN ONE is the claim for the adaptable tractor shovel, made by Drott Manufacturing Company, Milwaukee, Wis., for use with International tractors. By the operation of two hydraulic control levels, the Four-in-One changes from scraper, to dozer, to shovel, to clamshell, reportedly in a matter of seconds. Other attachments are available. (315)

A 15-TON MOBILE CRANE, which converts to a ⅝-cu. yd. clamshell or dragline, is described in a 12-page catalog. Specifications for the unit, Model 357, are given in the booklet released by the Unit Crane & Shovel Corporation, Milwaukee, Wis. (316)

THE MODEL W-12 FOUR-WHEEL-DRIVE TERRALOAD'R, made by J. I. Case Company, Racine, Wis., is described in a specification sheet, which describes bucket capacity, engine power, turning radius, etc., of the 6-cylinder diesel tractor. It has a capacity of 9,000 lb., bucket capacity of 2½-cu. yd., and 120 gross hp. (317)

TRUCK AND TRAILER LABORATORIES, as well as a test borer, field scales, controlled humidity cabinets, and other related equipment are described in a catalog from Testlab Corporation, Chicago, Ill. (318)

V-BELT DRIVES, manufactured by Dodge of Mishawaka, Ind., are explained in a folder. Photographs of applications demonstrate the use of the drive on pug mills, hammer mills, screw conveyors, and wash plants. (319)

ROCK BITS, both 2- and 3-cone, diamond drilling and coring bits, rotary drag bits, and subs (adapters), are described and illustrated in detail in a general catalog (1960-1961) from the manufacturer, Varel Manufacturing Company, Dallas, Tex. (320)

A DUAL ROTATION PERCUSSION ROCK DRILL, offered by Joy Manufacturing Company, Pittsburgh, Pa., is described in Bulletin 87-J. Penetration speeds, general specifications, and operating principles are described. (321)

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HIS LOG BOOK TELLS THE STORY

Dredge of Vincennes Gravel Company, using one of two Thomas Durable Dredge Pumps operated by this company.

J. BRYAN RIDDLE, Pres.-Gen. Mgr.
JAMES E. SMITH, Sec'y.-Treas.

SAND AND GRAVEL PLANTS
VINCENNES, INDIANA
LAWRENCEVILLE, ILLINOIS
CONCRETE PRODUCTS PLANT
VINCENNES, INDIANA

VINCENNES GRAVEL CO., INC.
PHONE TU 2-4930
VINCENNES, INDIANA

January 26, 1960

Thomas Foundries, Inc.,
Birmingham, Alabama.

Gentlemen:

Our first Thomas 8" Pump was installed in February, 1957. In less than 6 months we realized that we should change our 2nd Dredge to a Thomas. Our 2nd Pump was installed in July, 1957.

Our log book shows our Thomas Pumps outlast the old Manganese Pumps a minimum of 2 to 1. This in addition to an increase in our production.

We want to express our appreciation for the timely visits of your representative.

Very truly yours,
VINCENNES GRAVEL CO., INC.

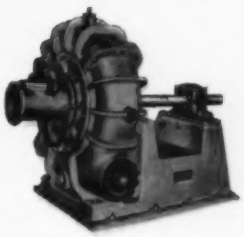
Bryan Riddle
Bryan Riddle

Why Mr. Riddle Now Operates TWO

THOMAS

DURABLE Dredge Pumps

Six months experience in 1957 with a new Thomas Pump, Series HL (8") discharge, made this Indiana Sand and Gravel Company realize that there IS A VAST DIFFERENCE IN PUMPS.



So, President Bryan Riddle installed a second Thomas Pump in July, 1957. Now, 2½ years later, his log book shows that his two Thomas Pumps have much longer life and give increased production. This record of "a minimum of 2-to-1" service life over manganese pumps, is accomplished in a rugged operation at Vincennes Gravel Company in which much of the gravel is large size.

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Thomas Durable Dredge Pumps are manufactured in range of sizes from 6" to 16" discharge. Write or phone for additional information.

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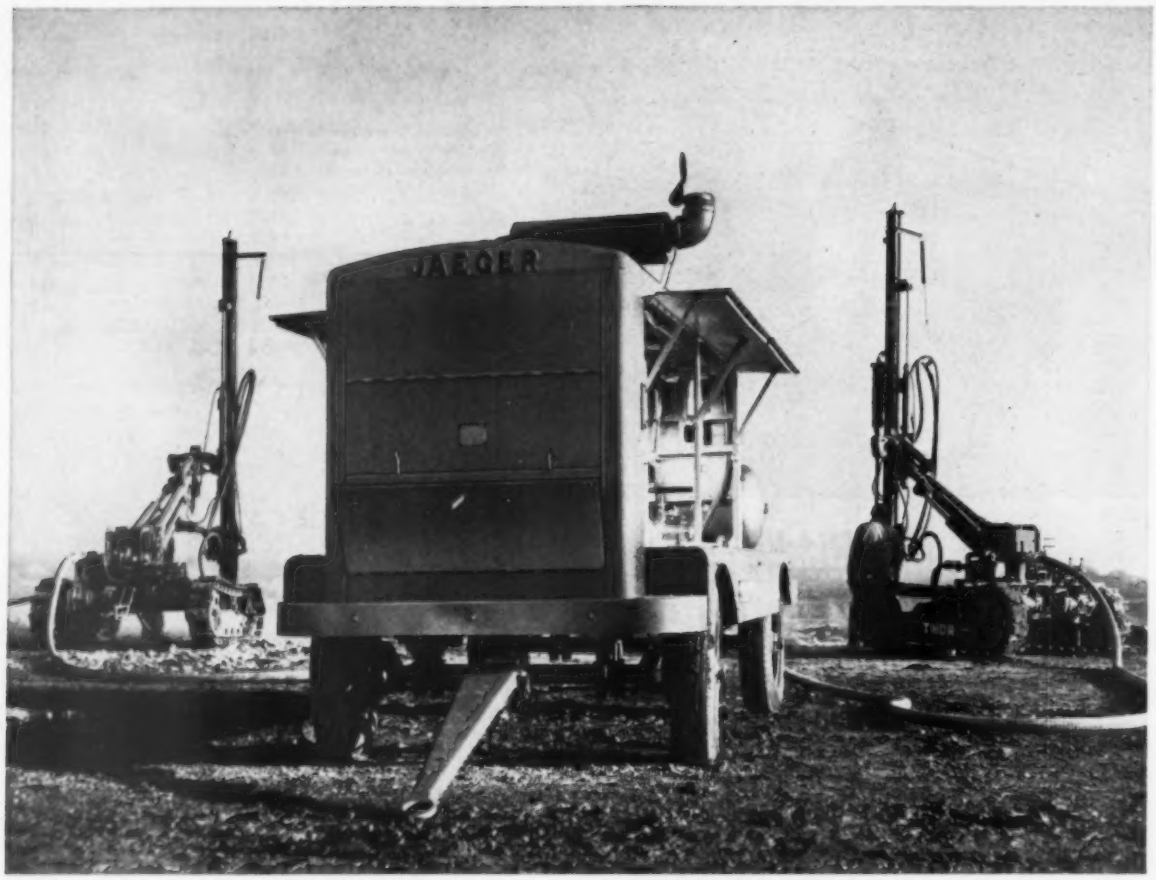
P. O. BOX 1111, BIRMINGHAM, ALABAMA



THE JOB was drilling 3″ holes to 25′ depth, in limestone so hard the insert carbide bits had to be reground after every 48′ to 50′ of drilling.

THE TEAM is a Jaeger "900" rotary compressor behind two Thor TR-5 air-and-hydraulic crawlers with 4½″ drifters.

FOOTAGE AVERAGED 2′ per minute (1′ per drill), the rate varying with the ledge strata.

A NOTABLE ECONOMY was in the fuel-saving, engine-saving speed of the compressor. *It maintained 100 psig at the drills without ever running faster than 1400 rpm.*

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Legal Decisions

On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

IT IS seldom that higher courts in different localities render so many outstanding decisions as were issued during the last few weeks. For the benefit of all readers, I shall briefly review the cause and outcome of these legal controversies.

Is Concrete Mixing Plant a Nuisance

Recently a higher court held that a concrete mixing plant may or may not be a legal nuisance, depending upon the circumstances under which it is operated.

For instance, in *Beaven v. City of Palatine,* 160 N. E. (2d) 702, a city ordinance was litigated which prohibited operation of all industrial plants that "are in fact nuisances or which may be obnoxious or offensive by reason of emission of odor, dust, smoke, gas, or noise."

A man named Beaven filed an application with the city for a permit to erect a ready mixed concrete plant. He said that such a plant measures out sand, cement, and gravel by enclosed dustproof and practically noiseproof chutes and delivers the proper proportions to ready-mix mobile trucks; and that these vehicles, equipped with water tanks, mix the ingredients *en route* to a job to form concrete, which is poured directly on the job.

The city officials argued that although the ordinance did not specifically prohibit the operation of a concrete mixing plant, the ordinance prohibited nuisances which may be obnoxious or offensive "by reason of the emission of odor, dust, smoke, gas or noise," and hence this broad provision of the ordinance automatically included concrete mixing plants. The lower court refused to agree with these contentions, and held that Beaven could lawfully construct and operate a concrete mixing plant.

The city officials appealed to the higher court on the contention that no definite proof was given that the plant would not emit odors, noise, dust. The higher court reversed the lower court's decision, saying that nevertheless Beaven could not be prevented from constructing and operating the contemplated plant if he proved that its operation would not violate the city ordinance. The higher court said:

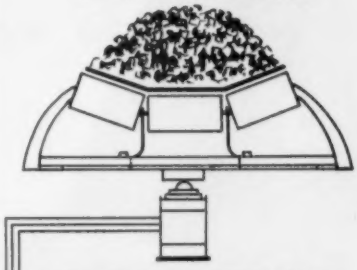
"A 'ready mixed concrete' plant is not a nuisance *per se*. Under the ordinance, if the use was such that it could become obnoxious or offensive by reason of the emission of odor, dust, smoke, gas, or noise, it would not be allowed. There is nothing said as to whether dust or noise results during the time when the ingredients are placed in the hopper in the plant or during the time that they are being poured into the trucks from the chutes, nor is there any indication as to the number of mixing trucks which would be employed or the noise, odors, etc., which might result from their operation. This is a triable issue of fact."

Varying Freight Rates

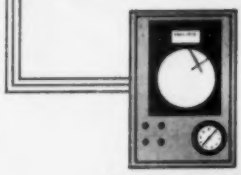
Recently a higher court held that a Public Utility Commission can make valid freight rates which vary considerably for materials in the same general classification.

For example, in *Nebraska Limetone Producers Association v. Chicago & North Western Railroad Company,* 97 N. W. (2d) 331, it was shown that the Nebraska State Railway Commission entered a regulation to the effect that rail freight rates for transporting crushed rock and stone are considerably higher than rates on sand and gravel.

ONE SIMPLIFIED SYSTEM



CONVEYS WEIGHS CONTROLS



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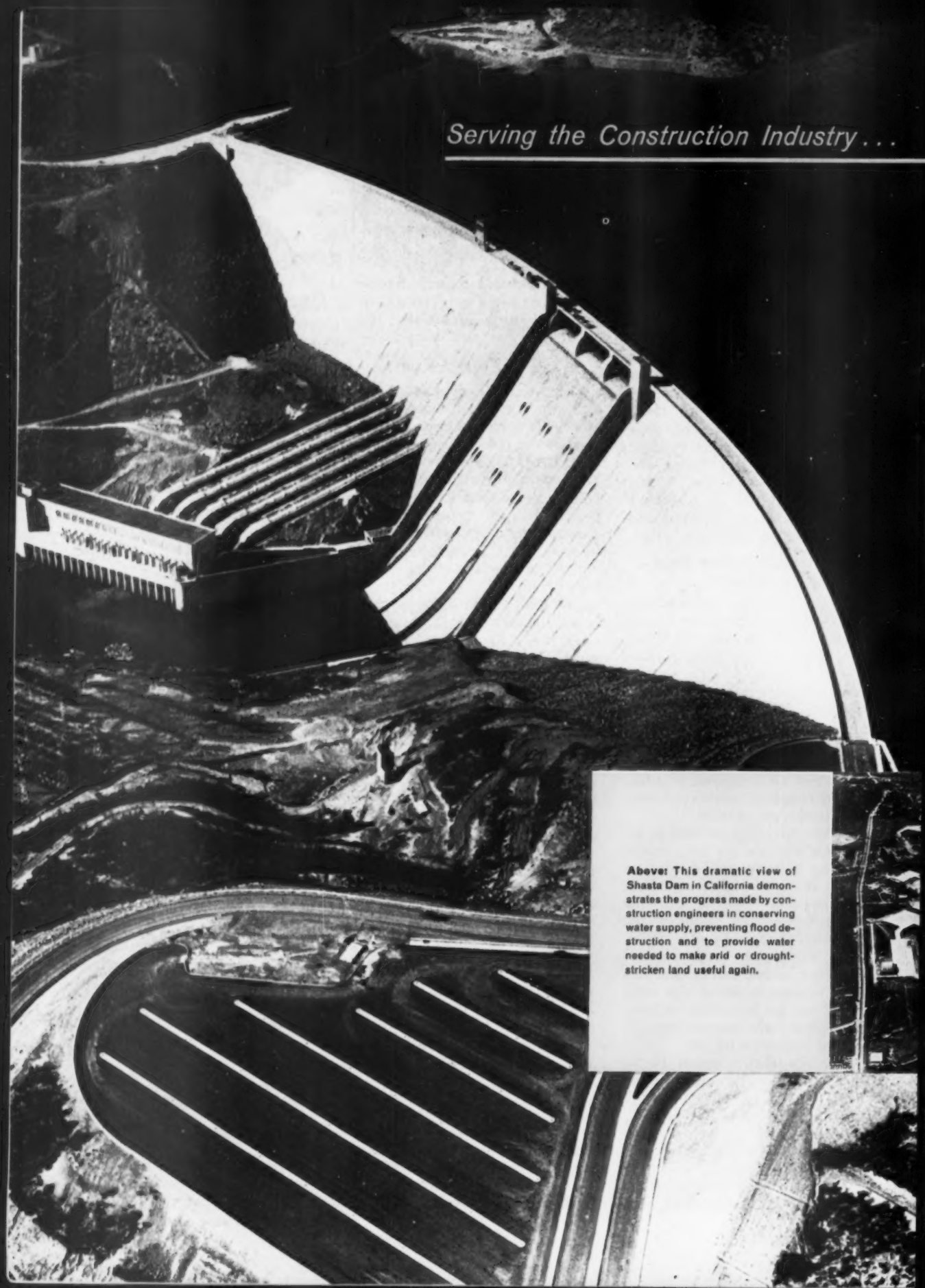
Serving the Construction Industry . . .



Above: This dramatic view of Shasta Dam in California demonstrates the progress made by construction engineers in conserving water supply, preventing flood destruction and to provide water needed to make arid or drought-stricken land useful again.

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SYMONS® CONE CRUSHERS

produce big tonnages of quality construction materials at low cost per ton

Illustrated here are typical examples of the vast contributions to the progress of mankind being made by the construction industry. Technological advancement in civil engineering of huge construction projects such as these call for rigid specification aggregates, crushed sand and cement. To meet the constantly growing demand for vast tonnages of these quality construction materials, Symons Cone Crushers have long been the first choice of leading producers throughout the world.

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Whether you are a contractor, operator, construction engineer, designer or manufacturer, it will pay you to specify and use Symons Cone Crushers . . . as well as the other Nordberg Machinery for the construction industry . . . *all* designed and built to deliver maximum output at lowest possible cost. *Write for literature.*

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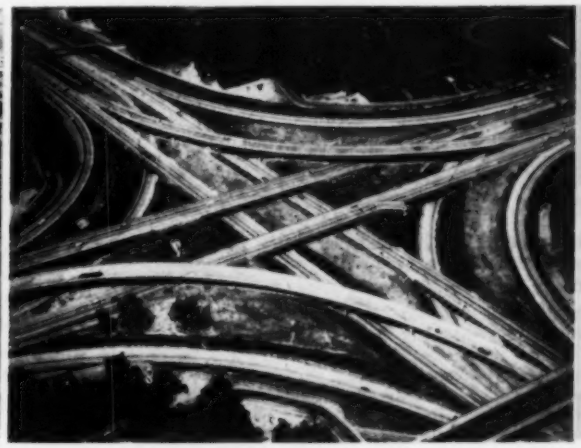

Far left: To meet the challenge of the jet age, engineers and contractors are being called upon to build and expand airport runways to handle the ever-increasing traffic. (View shows Lambert Field, St. Louis).

Left: This view of one of the interchanges on the high speed Detroit expressway is a striking example of the contribution the construction industry is making to the tremendous highway expansion program.

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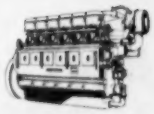
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A suit was filed by the Nebraska Limestone Producers Association to invalidate this regulation on the grounds that fixing a lesser rate on gravel than on crushed rock amounts to an undue and unreasonable preference and advantage to gravel shippers as compared to shippers of crushed rock, and that this results in unjust discrimination.

The higher court refused to change the rates as designated by the Nebraska Limestone Producers Association saying:

"After a consideration of all the evidence we conclude that crushed rock and gravel are not competitive in most instances. We conclude that there is competent evidence to sustain a finding that a reduced rate on gravel is required to meet competition with motor truck transportation. The evidence shows that a lower rate on gravel is necessary for railroads to compete with motor truck competition. Unless an unjust discrimination is shown, or the order of the commission is unreasonable and arbitrary in not being supported by evidence, the courts are without authority to interfere."

President's Authority

An official of a corporation asked: "Is a corporation liable and responsible on contracts made by its president?"

It is well settled law that a corporation is bound by contracts made by its president within the scope of the corporation's business. In other words, the president is conceded by the courts to possess natural power to bind the corporation in all business transactions pertaining to the corporation's business.

For instance, in the leading case of *Grummet v. F. G. Cement Pipe Company*, 181 Cal. 509, the court held that a corporation can act oniy through its authorized agents, and further that the president of a corporation has the natural power in the ordinary course of business, and in furtherance of the corporate interests, to execute contracts which bind the corporation. The court said:

"The president is, by virtue of this office, recognized as the business head of the company, and any contract pertaining to the corporate affairs, within the general powers of such officer, executed by the president on behalf of his corporation will in the absence of proof to the contrary be presumed to have been done by authority of the corporation."

Employer Loans Employee

Considerable discussion has arisen from time to time over the legal question: If an employer loans his employee to a friend for accommodation of the latter, who is liable for payment of compensation if the employee is injured or killed while working for this friend?

According to a late higher court decision, the employer, and not the friend, is liable.

For illustration, in *Shamburg v. F. Cement Block Company*, 45 N. W. (2d) 446, the testimony showed that a man named Orin was employed by the F. Cement Block Company. Orin was carried as a regular employee on the company's records. A stockpile of concrete blocks was created by the company for sales to be made during the building season. During the winter, when the days

MANITOWOC Recuperators
Can Increase Rotary Kiln Output Up to 30%!

Manitowoc Type S Recuperator mounted on unit-fired kiln 11′ x 400′.

★ *Rapid air quenching and cooling*
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MANITOWOC SHIPBUILDING, INC., *Manitowoc, Wis.*
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are very cold, concrete blocks are not manufactured.

One day the company loaned Orin to the owner of a sand and gravel business, and the company's official retained control over Orin. While doing work for the owner of the sand and gravel business, Orin was killed. The higher court ordered the block company to pay compensation to Orin's dependents, saying:

"The evidence in the instant case shows that Orin's contract for hire was made with F. Cement Block Company. In the case of a loaned employee, such direction and control is necessary and present."

This higher court went on to explain that in order to transfer liability from the general employer to the one to whom the employee is loaned, there must be some consensual relationship between the loaned employee and the employer, whose services he enters, sufficient to create a new employer-employee relationship. Hence, if an employee enters the service of another at the command and pursuant to the direction of his regular employer, no new legal relationship is created.

While the employee may be somewhat subject to the direction of the new employer, yet if he is there in obedience to the command of his regular employer, he is performing his duty to the regular employer, and the latter is liable for compensation payments, under the State Workmen's Compensation Act, if the employee is injured or killed without negligence of the new employer. On the other hand, if the injury results from negligence of the new employer, the latter is liable in damages to the injured employee.

Employee Drinks Excessively

A reader asked this question: "What is the legal rule which entitles an employer lawfully to discharge an employee without any liability to the National Labor Relations Board?"

A review of the late and leading higher court decisions shows that an employee may be lawfully discharged if he is guilty of disobeying reasonable rules and regulations instigated by his employer.

For example, a higher court has held that an employer may lawfully discharge an employee who violated his employer's regulations and failed to regularly report for work, and drank excessively.

See *National Labor Relations Board v. Cement Manufacturing Company*, 208 Fed. (2d) 85. In this case the testimony showed that a corporation is engaged in manufacturing cement at its plant. An employee was absent from work very frequently and also was drinking excessively.

This higher court held that the corporation could lawfully discharge the employes and that it need not reinstate him, notwithstanding a suit by the National Labor Relations Board. This court said:

"There was good reason for refusing to reinstate him; his drinking and absenteeism was well established, and the inference that the refusal to reinstate him was discriminatory, in the light of such evidence to the contrary, was quite unjustified."

Hence, this court held that the corporation did not violate the pro-

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Extra value features resulting from the higher bulk density and lower porosity of Walsh High Alumina Refractories include:

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Dry Press Process Kiln Liners 70% Alumina content PCE 37-38

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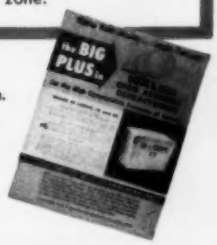
Assure excellent service in Hot zones of rotary Cement Kilns and Burning zones of Lime Kilns.

COMPOSITION:
Carefully graded and selected minerals noted for non-shrinking qualities, further enhanced by the dry press process of manufacture, imparting uniformity in size and shape.

Also available—Mullitex Liners for intermediate zone use and Warco XXD for use in the cold zone.



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Horizontal screen cloth openings are at a right angle to the fall of the material and the full area of each opening is available for sizing. More material of the proper size goes through each opening to assure closer grading of a greater volume of material. With Cedarapids, you get the accurately graded aggregate you need to meet the high-type specs so common today.

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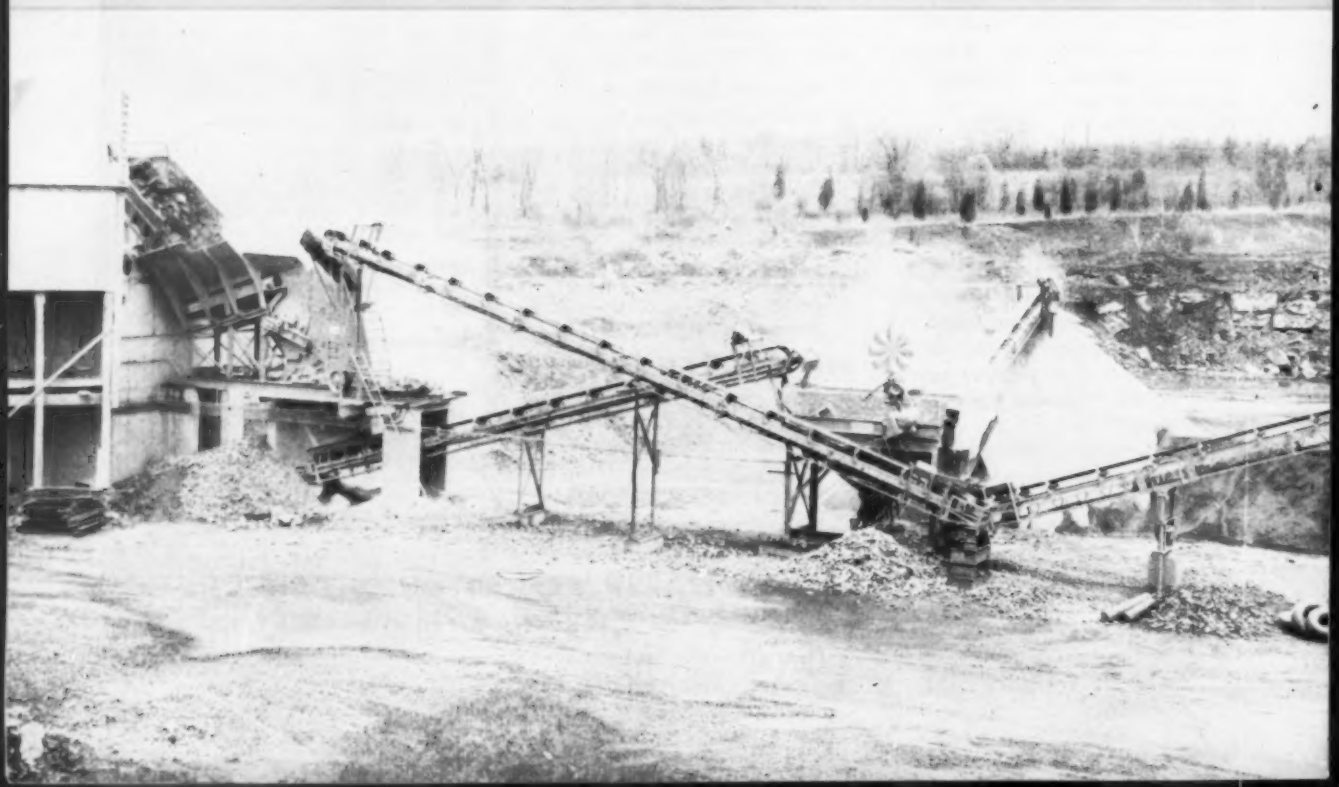

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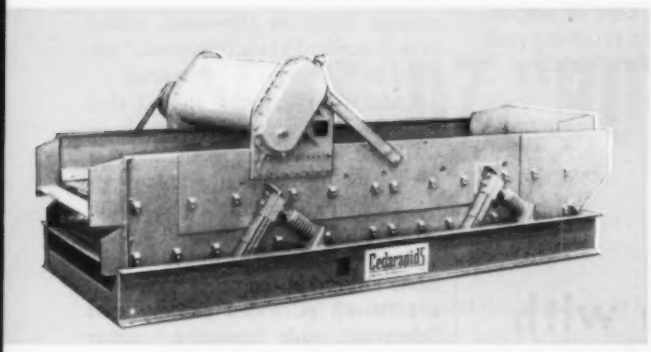
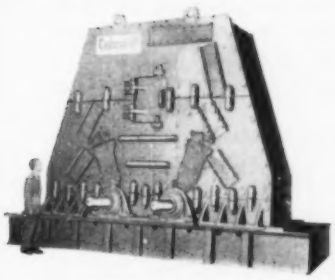


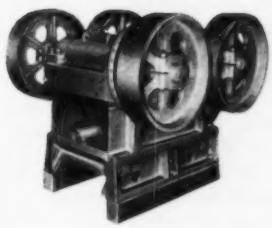
Cedarapids Built by IOWA **engineered for lowest cost per ton**

A complete line of Cedarapids components — production-balanced for your needs — produce *more* for *less*.



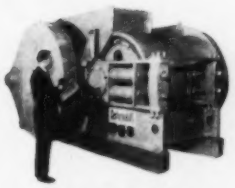
DOUBLE IMPELLER IMPACT BREAKERS

Exceptionally high capacities, plus high reduction ratios which often eliminate the need for auxiliary secondary crushers, screens, conveyors, etc., make Cedarapids Impact Breakers highly profitable in quarrying operations. Six models, from 22" x 22" to 53" x 60", meet your capacity needs. Portable models also available.



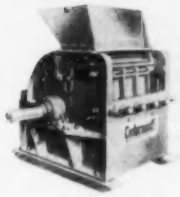
TWIN-JAW CRUSHERS

An exclusive Cedarapids design! Two movable synchronized jaws, operating at high speed, give you 40% to 100% greater primary crushing capacity than single-jaw crushers of comparable size. 5 to 10 times longer jaw life cuts maintenance. Available in three sizes. Single-jaw crushers also offered in 13 sizes.



ROLL CRUSHERS

Where high capacities of fine crushed products are required, Cedarapids roll crushers are ideal units for secondary reduction. Six model sizes offered to meet volume demands and balance primary production.



HAMMERMILLS

Exclusive Cedarapids Hammermill features produce a much finer quality of product, and size for size, produce more tons per hour than other similar types of equipment. 4 sizes available.

***Plus* bins, feeders, conveyors, vibrating grizzlies, washing plants.**

Send for this Bulletin TODAY!

It describes the complete line of Cedarapids Screens and explains the many exclusive features that help you increase your plant production . . . and profits.

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IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa

Gentlemen: Please send Screen Bulletin CS-6. Also send details about equipment I have checked.

☐ Engineered Stationary Plants ☐ Portable Aggregate Plants
☐ Components_____ (specify type) ☐ Bituminous Mixing Plants
☐ Bituminous Pavers

Name_____ Title_____
Company_____
Address_____
City_____ State_____

visions of the Taft-Hartley Act, 29 U.S.C.A. 158 (a) (1,3,5).

Law of Depletion Allowances

Recently a great deal of discussion has arisen among legal experts regarding a valid and acceptable rule for determining depletion allowances, particularly in the process of making cement.

A few weeks ago a higher court rendered an unusually interesting and important decision.

For example, in *M. P. C. Company v. United States*, 269 Fed. (2d) 629, the testimony showed that the cement company operates a limestone quarry and a cement plant. In addition to mining limestone, it also mines other raw materials which it uses in making cement. Further, the company purchased for use in its operations stipulated quantities of iron cinders and fluorspar. According to customary methods used in the cement industry, these raw materials were blended and processed into portland cement.

The process employed by the cement company may be summarized as follows: the calcium carbonate rock was obtained from the face of the quarry by the open-pit method, and further broken into manageable size by secondary or squib blasting. The rock was then taken by rail to a large primary crusher which reduced the size of the rock to pieces 6 in. in diameter or less.

After secondary crushing, the rock was transported to the cement plant and placed either in a limestone hopper or in a pile used to replenish the hopper. It was then blended with clay No. 1, clay No. 2, and iron cinders. Measuring and conveying equipment was used to accomplish this blending, The blended materials were then gravity-fed into a ball mill, where, with the addition of water, they were ground to a proper fineness known as "slurry." The slurry, after further grinding in tube mills, was conveyed to a wet slurry tank, where it was kept in suspension and blended by a revolving paddle mechanism. After blending, it was fed into a kiln.

The kiln-fed slurry was run into the upper end of rotary kilns, long rotating cylinders set at a slight inclination. The slurry traveled gradually toward the lower end. Hot gases from a flame at the lower end evaporated the water from the slurry, and the application of heat at a proper temperature chemically combined the remaining material into a dense "clinker." The clinker was conveyed to a grinding mill, where gypsum was added. This mixture was then ground to a great fineness to become one of the various types of portland cement. During the process tufa and fluorspar were added.

Further testimony showed that in its federal tax return for one year the M.P.C. Company considered its commercially marketable product from the mining of limestone to be limestone in the form of slurry. It considered the limestone to be "calcium carbonates," entitled to a 10 percent depletion allowance, rather than "chemical grade limestone," entitled to a 15 percent allowance.

Later the company alleged that its determinations referred to above were in error, and incorrect, and that the "commercially marketable product" was not limestone in slurry, but portland cement produced in bulk in sacks. It also averred that the limestone utilized in the process of manufacturing portland cement was "chemical grade limestone," rather than "calcium carbonate." Applying the higher gross income and higher depletion allowance rate derived from these new determinations, as limited by the 50 percent provision of the federal tax law, the company sought a refund in the amount of $264,435.41 for one year.

The lower court granted the cement company a refund of this amount on the argument that the "commercially marketable product was bulk portland cement. The lower court further found, however, that the limestone was not "chemical grade limestone." It therefore applied the 10 percent depletion rate for "calcium carbonates."

But by reason of the provision of the law which limits the allowance to 50 percent of the net income from the property, the depletion allowance which could be claimed was actually somewhat less than 10 percent. Therefore, the court awarded the

A SMASH HIT!

every time with
Cape An Alloy
FORGED
DROP BALL

Quarry operators know that the Cape Ann DROP BALL is profitable to use as a secondary rock-breaker, because it is unparalleled for efficiency . . . unchallenged for economical production. Forged and heat treated . . . tough and abrasion-resistant, Cape Ann steel DROP BALLS deliver a smash hit every time. Sonic tested before shipment and fully guaranteed, they save time and money. Available in 2,000 to 12,000 lbs.

Write TODAY for complete information.

CAPE ANN
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P.O. BOX 360
GLOUCESTER · MASSACHUSETTS

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ONE D7 "BUYS" ANOTHER!

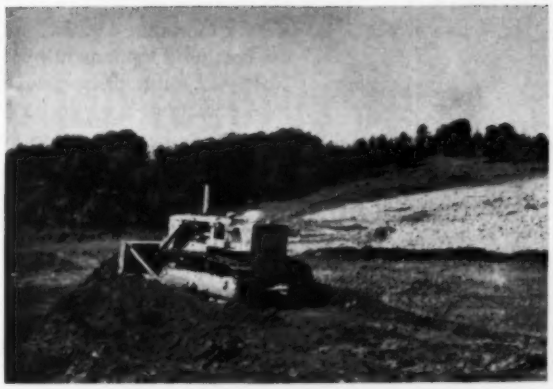
Just as sure as if the tractor signed the order, a D7's record bought this new tractor for Tyrone Rock Products Company of Atlanta, Ga. "Past performance of our D7s is the reason we selected another one for our new Yatesville plant," said General Superintendent John Hale.

Along with high power, reliability is built in the D7 Series D Tractors to meet 20-hour days and high production of plants like these. And D7s are famous for working around the clock, day after day when the job demands.

The Turbocharged Caterpillar D339 Engine develops 140 HP at the flywheel, 112 HP at the drawbar, with high lugging ability. The D7 also features a new dry-type air cleaner, lifetime lubricated rollers, stronger final drive gears, and optional in-seat starting. These new features, along with the field-proved oil clutch which delivers as many as 2000 hours without adjustment, keep users sold on the D7's low maintenance cost.

For a practical demonstration of what these machines can do, call your Caterpillar Dealer. His reliable parts stock and service facilities stand behind your investment.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.



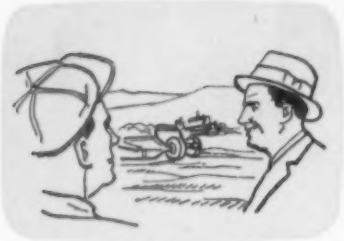
Another D7 of Tyrone Rock Products Company clears land for the new Yatesville plant. After helping to clear the 35-acre site, this D7 will be used for stockpiling operations of the 300-tons-an-hour production.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

STEP UP PRODUCTION WITH A NEW D7

Bill Smith, contractor, speaks on used equipment!



"Take it from me, I've bought some real junk in used machines. Fixing 'em up and keeping them fixed used to be just one long headache.

"But now things are a lot different. When I buy used equipment, I buy from a Caterpillar Dealer.

"I've found Caterpillar used machines similar to new in more ways than one. They stand up better and are easier to keep working. And here's something else that's important . . .

"By keeping them in good shape, when I trade them back in, I get top dollar. I guess you could call that 'built-in' value!"

BONDED BUY

Your Caterpillar Dealer can give you the best used equipment buys in town. No other outfit offers you deals with this protection:

A "Bonded Buy" up to $10,000 on used Caterpillar equipment—your guaranteed assurance of satisfactory machine performance and on *all* parts of the machine during the guarantee period . . . and it includes labor, too. Also a "Certified Buy" and a "Buy and Try" class of machines that give you full value for the money.

You *know* what you're buying from a Caterpillar Dealer. He's listed in the Yellow Pages. Make his lot your first stop for used equipment.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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BEST BUYS IN NEW AND USED EQUIPMENT

Enter 184 on card, page 169

sum claimed by the cement company, notwithstanding the fact that a 10 percent rather than a 15 percent depletion allowance was held to be otherwise applicable.

The cement company contested these for future tax reasons, despite the fact that the judgment was in the full amount sued for, and that a 15 percent allowance would not have entitled this company to any greater award.

Finally, the higher court held that the addition of the relatively small amounts of other materials was part of the "ordinary treatment" process in converting limestone into portland cement. In this respect, the higher court said:

"We perceive no reason for distinguishing between the cost of the additives and the cost of blending them with limestone in computing the depletion base. The base on which the depletion allowance is to be computed is that of a commercially marketable product."

The court went on to explain that its decision was that Congress intended to provide a simple, practical rule which could be applied with some measure of confidence in computing the depletion deduction. The higher court held further that the cement company's limestone should not be characterized as either calcium carbonate or chemical limestone. In other respects, the higher court approved the lower court's decision.

Bound By Bid

The law is now established that a contractor is bound by his bid to do certain work and supply materials at the price specified in a telegram or a letter. This is so although the contractor may have submitted a low bid unintentionally and by mistake.

For illustration, in *Acoustics Company v. Thomas,* 320 S. W. (2d) 650, the testimony showed that a general contractor named Thomas contemplated signing a contract to build a new church. Before making the contract bid, Thomas asked certain subcontractors to submit bids for furnishing and installing various materials. One subcontractor sent a telegram to Thomas saying that he would do certain work and supply materials for $3,723. However, apparently through an error in the telegram, the price was $2,723.

In the meantime Thomas signed

Where heavyweights move job records prove...

FIRESTONES PULL HAUL COSTS DOWN!

Take a tip from nationwide construction records—Firestones lower tire costs per job! Here's why: Firestone off-the-highway tire dependability plus Firestone's Giant Tire Service keeps expensive equipment on the job and *working*. Firestones are built with Firestone Rubber-X, the longest-wearing rubber ever used in Firestone tires. Firestone Shock-Fortified nylon cord is a natural for off-highway loads—holds impact damage to the minimum. And your Firestone Tire Expert will help you match tires to the job as well as handle all maintenance problems. Turn downtime into worktime with Firestone tires and service! Call your Firestone Dealer or Store today.

WHEN ORDERING NEW EQUIPMENT ALWAYS SPECIFY FIRESTONE TIRES

TUBELESS OR TUBED

Super Rock Grip Wide Base* Super Rock Grip Deep Tread*

Firestone

BETTER RUBBER FROM START TO FINISH

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*Firestone T.M.

a contract to build the church. The next day Thomas received a letter from the subcontractor explaining the error in the figures and stating his correct bid was $3,723. An argument resulted; but the subcontractor, believing that he could collect $3,723 from Thomas, completed the job. Thomas refused to pay more than $2,723, and the subcontractor sued to collect $3,723 from him.

The lower court held that the subcontractor could collect no more than $2,723 from Thomas. The higher court approved this decision.

Officials' Personal Liability

The higher courts very often have held corporation officials liable if they exceed their normal authority.

For example, in *Dixie Company v. County of Orange*, 264 Fed. (2d) 738, the testimony showed that a state law requires that all public work contracts exceeding $4,000 must be let to the lowest bidder; and an advertisement for bids must have been inserted in a local newspaper, and plans and specifications must have been filed.

A contractor signed a contract with a county to perform work on a water tank, including concrete work, for $7,511.60. When the job was finished, the county would not pay $7,511.60 to the contractor because the contract was in excess of $4,000 and there was no advertising in newspapers for bids.

In subsequent litigation, the higher court held that the contractor could not recover from the county unless he proved that an emergency existed under which he could not delay doing the job by filing plans and specifications and advertising for bids.

The higher court indicated that the county chairman who accepted the contractor's bid might be personally liable to pay the contract price $7,511.60 to the contractor unless the testimony clearly showed that no emergency existed when the contract was let to the contractor. This court said:

"There is nothing in the general principles or policy of the law which forbids an agent from waiving his immunity and making himself personally responsible."

Negligence Is Not Presumed

In the past, higher courts have held several quarry companies liable in damages for the drowning of children in unfenced, water-filled excavations. Last month a higher court clearly modified this usual rule of the law.

For example, in *Schaffer v. Claremont Club*, 337 Pac. (2d) 139, the testimony showed these facts:

A company used an excavation created by quarrying operations as a reservoir for water to irrigate certain land. The son of one Schaffer fell into the reservoir and was drowned.

Although the jury held that Schaffer could recover damages from the property owner, the higher court reversed the verdict because the court had erroneously instructed the jury that the property owner was negligent because he had failed to cover or securely fence the abandoned excavation dangerous to minors under 12 years of age.

In other words, this court held that a property owner is not always liable in damages for the death of a child who drowns in an unfenced water-filled hole or quarry excavation.

New Freight Rate Law

A few weeks ago a higher court established the law that freight rates established by a Public Service Commission or Public Utility Commission are effective, notwithstanding contracts to the contrary between shippers and transportation companies.

For example, in *Alkire v. O. Materials Company*, 341 Pac. (2d) 853, the testimony showed that the minimum rate prescribed by the Public Utility Commission for the transportation of rock, sand, and gravel was $10 per hour. One Alkire signed a written contract to haul sand and gravel for the O. Materials Company for $8.50 per hour.

The testimony showed that Alkire was paid $9,388.48, whereas, at the rate of $10 per hour, he should have been paid an additional $1,650.80.

The higher court held that the O. Materials Company must pay this amount of $1,656.80 to Alkire, saying:

"Under such circumstances, the law deems the minimum Public Utility Commission's rates to have been a part of the contract."

FOR LIMESTONE

FOR CRUSHED ROCK

Webster BUCKET ELEVATORS

WEBSTER Bucket Elevators can handle practically any capacity requirement. Made in centrifugal, perfect or gravity discharge, continuous bucket, and super capacity types. Buckets can be furnished malleable iron, duramal or steel.

The rough, tough service encountered in rock products plants poses many problems for plenty of producers—until they place those problems in the hands of WEBSTER Engineers.

WEBSTER Bulk Materials Handling Systems will keep your production on the move—efficiently and economically—because they are based upon "know how" gained through 84 years' experience. All components of WEBSTER equipment are manufactured and assembled in our own plant.

Write for Catalog BE-55

Webster MANUFACTURING, INC.
DEPT. Q-40, TIFFIN, OHIO
BULK MATERIALS HANDLING EQUIPMENT
Offices in all Principal Cities

SINCE WMA 1876

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Raise the clam and you have a full-size, full-capacity dozer for stripping overburden or pushing gravel down the bank, tons at a time. 'Dozer rides on exclusive "skid shoes," to keep cut accurate, and prevent uneven blading.

Doubles for DOZER, SHOVEL, SCRAPER, CLAMSHELL . . . *even dynamite!*

Clam-action 4-in-1 offers you money-making possibilities, unlimited

Open the clam of an International Drott 4-in-1 and a whole new range of equipment versatility opens for you. Each big-capacity 4-in-1 action "doubles" for one or more specialized earthmovers!

Skid-Shovel action takes over for the power shovel —and with tremendous triple-power, pry-over-shoe break-out action often doubles for dynamite in grubbing stubborn stumps, buried boulders, or hard clay, gumbo, and rock. *"Carry-type scraper"* action works like a scraper or dragline on jobs like stripping overburden...also gives you grader-like precision on haul road maintenance. *Clamshell action* lets you "back-drag"; grab and load solid objects like stumps; "surround" loose materials without chasing them! *Bulldozer action* gives you versatile blading, depth-regulated by radius control!

You adjust and control each 4-in-1 action, seconds-fast, hydraulically from the tractor seat. Each action gives you a wide range of job-handling working positions. And only the 4-in-1 has the positive performance protection of shock-swallowing Hydro-Spring!

Just move the machine selector lever to put a whole spread of equipment actions at your fingertips!

Prove first hand that a versatile 4-in-1 can give you money-making ability, unlimited! Let your International Drott distributor demonstrate!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

Instead of burrowing into the bank and risking slide dangers, use clam to back-drag loose material within safe reach. Then load either with clamshell or regular 4-in-1 bucket action.

Get higher reach than roll-forward type buckets by bottom-dumping! Opening the clam pulls sticky material from bucket surfaces—gravity pull does the rest!

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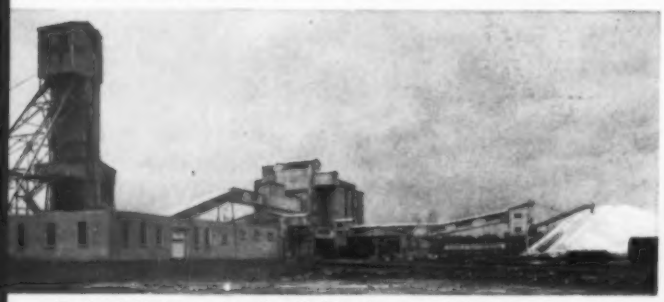
Pass the salt...

from 2,000 feet below Lake Erie

...a job for USS Tiger Brand

Fairport Harbor Mine of the Morton Salt Company showing skip hoist at left and processing plant at right.



Rock salt discharges from the skip into a hopper and then flows on to a conveyor leading to the processing plant.

Skip hoist equipped with two Tiger Brand wire ropes. Two skips operate simultaneously—one discharges at the top while the other loads at the bottom.

The deepest salt mine in the United States is located at Fairport Harbor, Ohio, about 25 miles northeast of Cleveland. It taps a vast bed of salt 2,000 feet below the surface and extending far under Lake Erie. This is the first mine of its kind built in this country in the last 25 years. The shaft is deeper than the height of the Empire State Building.

Geologists estimate that the high-grade rock salt in this location will last over 200 years. The Morton Salt Company of Chicago, developers of the mine, aim to produce about 500 tons of salt an hour. All of it will be used for industries in the East and Midwest and for spreading on highways and sidewalks in winter.

USS Tiger Brand Wire Rope forms the vital connecting link between the salt bed and the surface. Two huge skips, shaped like rockets, have a capacity of 16 tons each and make 31 trips per hour. They are hoisted at a rate of 1,380 feet per minute by two Tiger Brand 2⅛" dia. Special Mine Hoist Ropes 2,580 feet long. These ropes provide the strength, fatigue and abrasion resistance necessary for safe and economical service. To prevent corrosion from the salt, the ropes are thoroughly lubricated at the factory and are relubricated every month at the mine.

Why USS Tiger Brand is your best buy. Tiger Brand Wire Rope is designed by one of the industry's most capable staffs of wire rope engineers. It is made by a company that maintains the most complete research and manufacturing facilities in the steel industry. When you buy Tiger Brand you get the right rope for the job. And your installation is no further away than a phone call from experienced American Steel & Wire field service representatives.

For more information, write American Steel & Wire, 614 Superior Ave., N.W., Cleveland 13, Ohio.

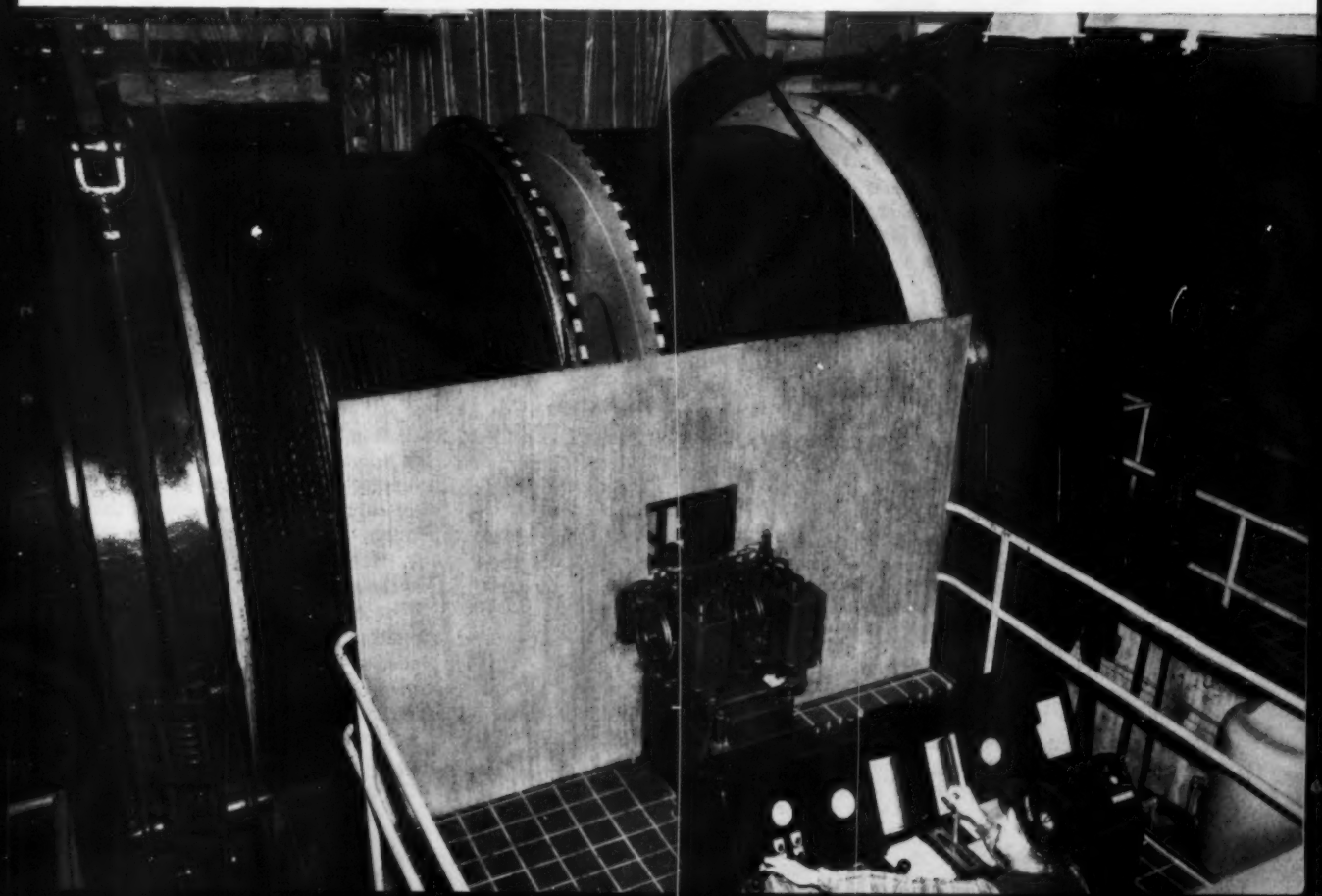
USS and Tiger Brand are registered trademarks

American Steel & Wire
Division of
United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors
United States Steel Export Company, Distributors Abroad

Wire Rope

USS Tiger Brand Wire Rope on the huge 12-foot diameter skip hoist drums. Skip operator can tell when skip is loaded by a series of different colored lights. Depth indicators show position of each skip.



Manufacturers' News

HERMAN HARTJENS will be technical representative for South America for Cyanamid International's mining chemicals department. He will make his headquarters in Lima, Peru, directing Cyanamid's mineral dressing services. Also, he will visit all mines and concentrators on the continent, giving help on ore dressing problems, and introducing new methods and processes using Cyanamid reagents. He will be assisted in these activities by THOMAS E. ROJAS, of Cyanamid's Lima office.

Mr. Hartjens, educated in Holland, joined the company in 1946 as a mineral dressing engineer.

H. Hartjens

F. T. Cushing

FRED T. CUSHING has been named sales manager of The White Motor Company's new PDQ (Pickup and Deliver Quickly) Division, which will function as part of the White Truck Division in marketing a new line of trucks.

Mr. Cushing has previously held sales managing responsibilities with Autocar, Dodge Division of Chrysler, and Divco.

The White Motor Company has purchased the designs, tooling, and inventory for the half-cab ready-mix and dump-truck chassis developed and marketed on the West Coast the last five years by Cook Bros. of Los Angeles, it was announced recently by J. N. BAUMAN, president of White Motor.

The half-cab chassis will be manufactured at White's Lansing (Mich.) plant, and will be distributed nationally. Cook Bros. organization will continue to merchandise the half-cabs in its present territories.

ROBERT J. MCGINNIS has been appointed to the position of senior sales representative for the Mining Tool Division of Kennametal Inc., Latrobe, Pa. Mr. McGinnis has been a district sales supervisor for the last 12 years. His new duties will include market studies and customer relations on a nation-wide basis.

DICK W. WELCH has been appointed district sales manager for the Northern District, succeeding Mr. McGinnis. Mr. Welch has been with Kennametal since 1950.

MAX E. COLSON was elected vice-president of Atlas Powder Company at a meeting of its board of directors recently. He will be in charge of the company's Explosives Division, succeeding W. C. LYTLE, who retired at the end of 1959.

THOMAS O'LEARY has been appointed V-belt product manager for the Boston Woven Hose & Rubber Division of American Biltrite Rubber Company, Boston 3, Mass. Mr. O'Leary has been associated with the Boston Division for several years, and prior to his promotion served in the capacity of V-belt sales promotion specialist.

HOWARD MEHR has joined the Dorr-Oliver Incorporated staff, serving as supervisor of technical publicity.

Before joining Dorr-Oliver, Mr. Mehr worked with Harry W. Smith Incorporated.

CARL S. BARKER SR. is the newly appointed direct factory sales representative for Builders Equipment Company, Phoenix, Ariz. He is engaged solely in the sale of Superlite Unloader equipment in all of the New England states, as well as New Jersey, Delaware, and the eastern portions of New York, Pennsylvania, and Maryland.

Appointment of GERALD G. CHRISTIANSEN as a development engineer in the Pyro-Processing section has been announced by Allis-Chalmers Processing Machinery Department.

Before joining Allis-Chalmers Mr. Christiansen participated in an international study of cement manufacture and the Korean cement industry.

H. Van Houten

G. Christiansen

HERMAN VAN HOUTEN has been elected vice-president and general manager of the Mining and Construction Division of Joy Manufacturing Company. For the last two years Mr. Van Houten has been assistant to the president, in which capacity his responsibilities included liaison with Joy's overseas operations. In his new position, Mr. Van Houten will be responsible for the administration of all sales, service, engineering, and manufacturing functions of his division. The principal products of Joy's Mining and Construction Divisions are rock drills, portable compressors, core and blast hole drills, mine hoists, and crushers.

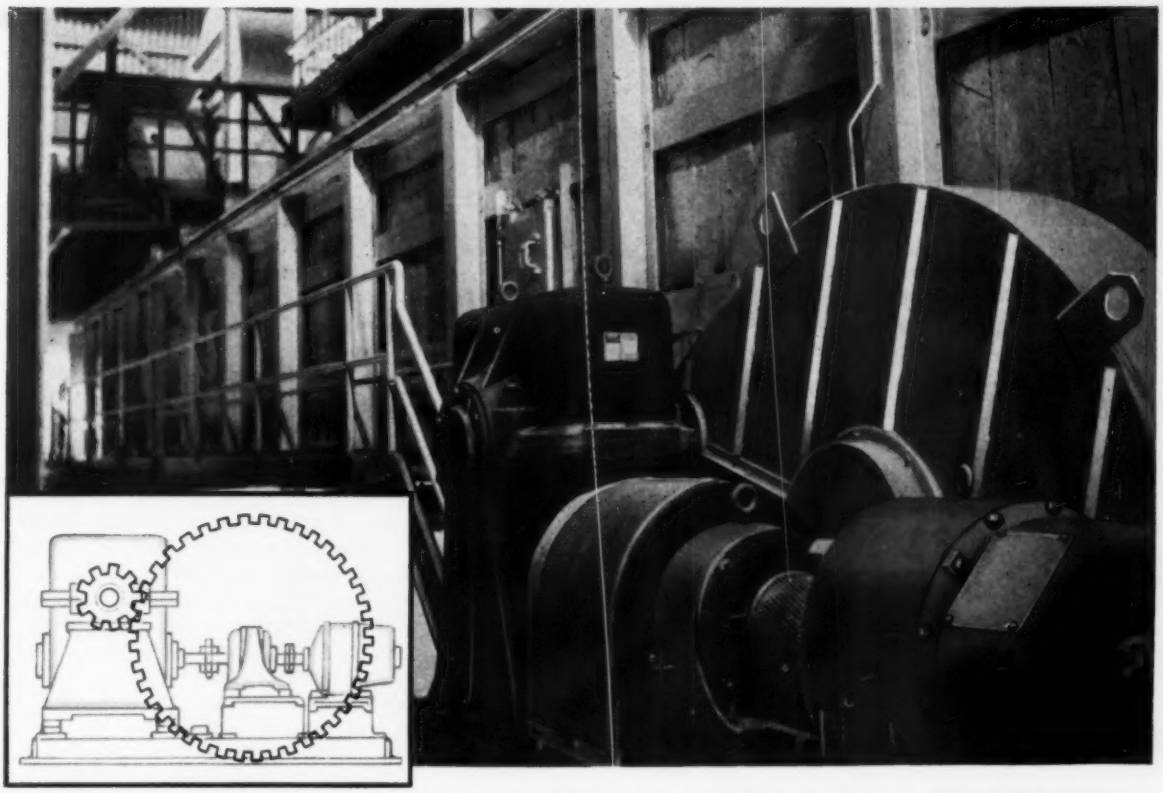
Mr. Van Houten is also a director and vice-president of Joy's Mexican subsidiary, Joy-Sullivan Machinery Co., S.A. de C.V.

Mr. Van Houten has held many administrative positions in sales, parts service and production, with Joy and its predecessor companies.

WILLIAM E. ARCHER has been promoted to the position of manager of research and development for the Western Precipitation Division of Joy Manufacturing Company, Los Angeles, Calif.

Mr. Archer joined Western Precipitation in 1950 as a service engineer in the New York office, later moving to the home office in Los Angeles. He was most recently chief development engineer for the division.

Foote Bros. Drives In The Cement Industry



Team of Reducers GIVES PERFORMANCE PLUS Driving Marquette Cement's ACL Grate

Two Foote Bros. Reducers team up to provide a powerful, close-coupled drive for the ACL Chain Grate used in Marquette Cement Company's ultra-modern Milwaukee plant.

Dependable power—and plenty of it—was required to drive the head shaft of the 82 ft. long x 12½ ft. wide furnace grate which moves pelletized raw material through the drying and preburning chambers.

Problem: In a limited space, provide a right angle drive capable of delivering a final torque of 1,400,000 in. lbs. at the head shaft of the grate.

Solution: To provide the necessary reduction from a 20 HP variable speed motor, a Foote Bros. 224 SL concentric shaft Reducer was coupled to an 18 S Right Angle Worm Gear Reducer which drives a large spur gear set to turn the grate.

The smooth, steady, and positive grate travel provided by the team of Foote Bros. Reducers, is an important requirement of the carefully balanced Marquette process. Since going into service almost two years ago, the Drives have met every requirement of Marquette's design and production engineers for "no downtime" performance.

There's a Foote Bros. Drive made to meet your power transmission requirements. Ask your nearby Foote Bros. Authorized Distributor for information or assistance concerning your power transmission problems. He's ready to help you.

FOOTE BROS. GEAR AND MACHINE CORPORATION
4571 South Western Boulevard, Chicago 9, Illinois

POWER TRANSMISSION DRIVES

Alabama's State Highway Department has contracted with the General Electric communication products department for 275 mobile radios—one of the largest highway maintenance communications systems in the nation—as a means of speeding a gigantic road-building program involving a half billion dollars.

In addition to the mobile units, to be used in cars and trucks, the system will include 48 General Electric base stations. These will be installed at the Highway Department's Montgomery headquarters, seven division offices, and various highway camps, and district offices throughout the state.

The Winger Manufacturing Company, Ottumwa, Iowa, has purchased the Bulkmaster line of self-unloading, bulk-materials truck bodies and trailers from Dorsey Trailers of Elba, Ala.

GEORGE F. FORD, former Dorsey sales manager of Bulkmaster Division, and L. R. (DOC) LYONS, former Dorsey chief engineer of Bulkmaster Division, will continue in these capacities with the Winger or-

G. F. Ford

L. R. Lyons

ganization. Mr. Ford will be assisted in sales by KENNETH ROHM. The present distributors, also, will continue to play an important part in the proper handling of services and sales.

ROBERT D. O'BRIEN and JOHN G. HOLMSTROM were assigned new responsibilities in Pacific Car and Foundry Company, Seattle, Wash., in a recent announcement.

Mr. O'Brien has been appointed executive vice-president, and has general jurisdiction over the sales and manufacturing of the company, its subsidiaries, and divisions. Mr. O'Brien joined Kenworth Motor Truck Company in 1943, and in order, became vice-president and general manager of that firm, and vice-president—sales of Pacific Car and Foundry Company.

Mr. Holmstrom is devoting full time to the advanced engineering and designing of on- and off-highway motor trucks for both the Kenworth and KW-Dart Truck Company Divisions. His engineering and management career with Kenworth and Pacific Car dates from 1923.

A new sales and service branch has been opened in Portland, Oreg., by Baker Industrial Trucks, a division of the Otis Elevator Company. This division manufactures gas and L. P. gas-powered and electric-powered fork trucks, platform trucks, crane trucks, and the side-loading Traveloader fork truck.

WILTON SMITH will be in charge as the Portland branch manager.

Baker is represented by Green-Penny Company in Los Angeles, Elder & Company in San Francisco, and Charles Industrial Sales Company in Seattle.

FRED E. KENDALL has joined The S. K. Wellman Company, manufacturer of heavy-duty sintered metal automotive and industrial clutch and brake linings at Bedford, Ohio, as assistant to the president.

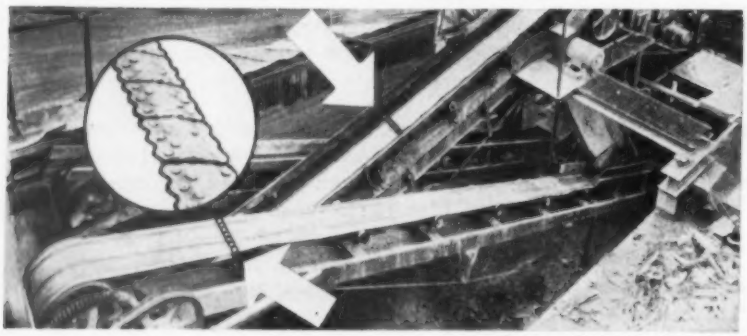
D. B. SCOTT has been named manager of Allis-Chalmers Manufacturing Company's control department, succeeding F. C. LUDINGTON in that post. He assumed his new duties on March 1.

Mr. Ludington has been associated with Allis-Chalmers since 1923. He will serve as a consultant until his retirement on July 1.

Mr. Scott has been with the firm since 1937. Since 1958 he has been manager of the rectifier section.

Succeeding Mr. Scott in his for-

"We tried them all— then standardized on CRESCENTS"



Camarco Contractors Plant No. 1

"Our conveyor belts take a terrific beating and only a rugged fastener will hold them. We found that CRESCENT plates did a superior job, and because of the speed with which they can be attached with CRESCENT self-clinching rivets, *WE CUT OUR DOWN TIME IN HALF!"*

NO HOLES TO BORE • A HAMMER IS ALL YOU NEED! • NO TOOLS NECESSARY

CRESCENT BELT FASTENER CO.

381 Fourth Ave., New York, N. Y.

TORONTO, CANADA — BIRMINGHAM, ENGLAND

Distributors throughout the World

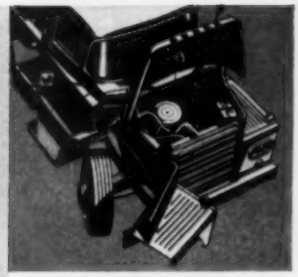
Enter 192 on card, page 169

NEW DODGE CAB-FORWARDS thrive on tough construction jobs

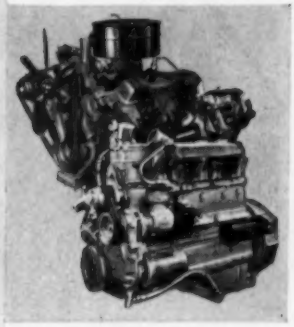
They're built big to work big, these brawny new Cab-Forwards by Dodge. And, to fit any job, there are models ranging from 15 to 53 thousand pounds G.V.W. Available in tandem and single-rear-axle models. Straight trucks and tractors. Gasoline and Cummins diesel power.

Just 89¾ inches from bumper to back of cab, these heavyweights have handling qualities akin to half-tonners. And their engines are positioned for easiest service access through exclusive Servi-Swing fenders.

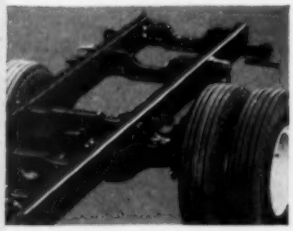
For greatest hauling efficiency and economy on tough construction jobs, your big buy is Dodge. Available through your local Dodge dealer.



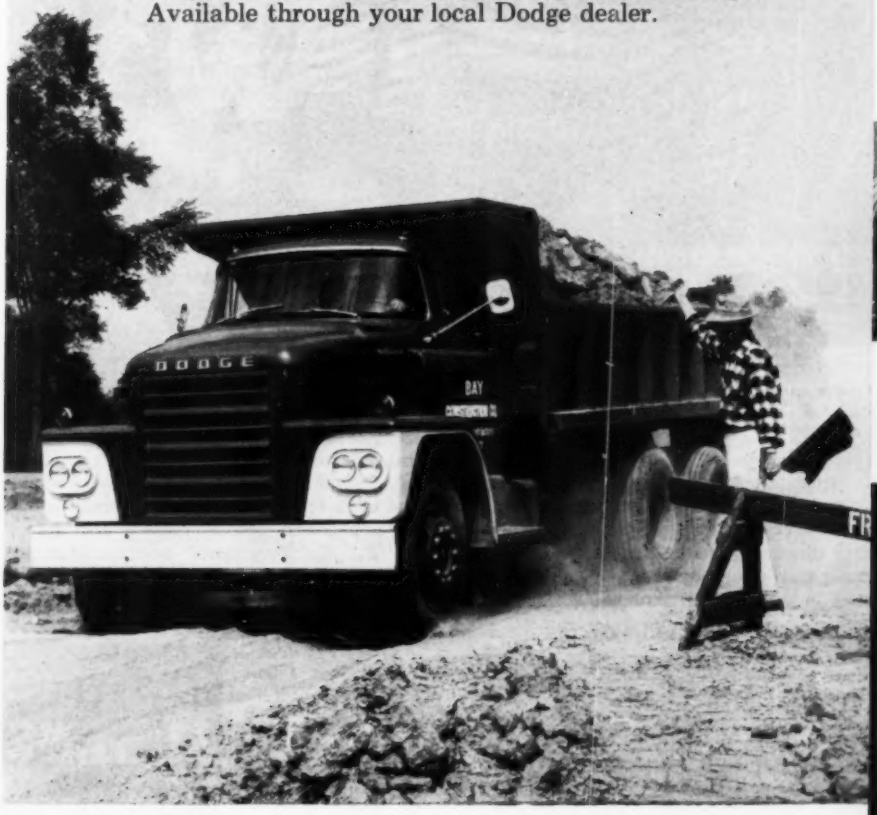
SERVI-SWING FENDERS open out at the pull of a latch to let a man walk right up to the engine for unrestricted servicing. This exclusive Dodge feature spares you the extra cost and bother of a tilt-cab model.



NEW GAS AND DIESEL ENGINES let you pick the kind of power best suited to your requirements. Gas V-8's from 178 to 228 hp.; economical Cummins diesels from 175 to 220 hp., up to 743-cu.-in. displacement.

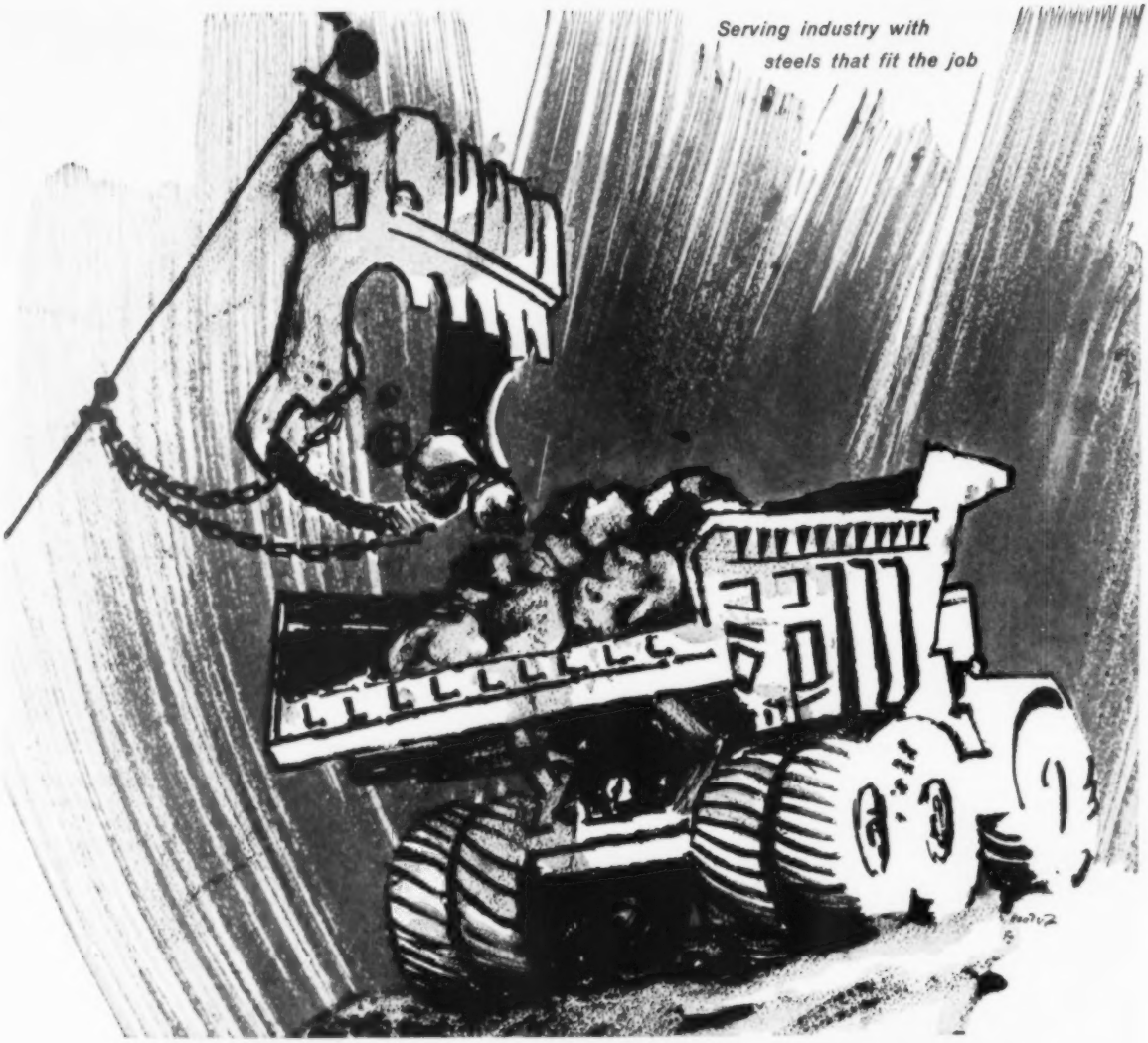


TOUGH DODGE FRAMES of heat-treated, chrome-manganese steel provide exceptional load support while reducing excess chassis weight for C800 models and up.



DEPEND ON **DODGE** TO SAVE YOU MONEY IN **TRUCKS**

A PRODUCT OF CHRYSLER CORPORATION



GET TOUGH

WITH LUKENS "T-1" STEEL

TRADEMARK

Where the going gets rough, versatile Lukens "T-1" steel fights back. For repair or modification of heavy duty equipment such as truck beds, chutes, bucket teeth and dozer blades, this special duty steel plate can be ordered from *warehouse stock* in a wide range of plate sizes and gages. Lukens "T-1" is the modern mining steel—you can work and weld it in the field as readily as in your shop. Its terrific resistance to abrasive impact—coupled with an extremely high yield strength—means fewer replacements and often greater payloads. That's why more and more equipment builders are using Lukens "T-1" to provide longer life in shovel buckets, trucks and other mining equipment. Remember to specify the extra-tough 321 min. BHN quality. For performance and application details, request our special booklet, "Lukens 'T-1' for Toughness." Address Manager, Application Engineering Dept., 040 Services Bldg., Lukens Steel Company, Coatesville, Pennsylvania.

You can order Lukens "T-1" steel plate from these Steel Service Centers:

Alabama, BIRMINGHAM 2, O'Neal Steel, Inc., P.O. Box 2623 • **California,** LOS ANGELES 54, Earle M. Jorgensen Co., P.O. Box 2358, Terminal Annex, 10650 S. Alameda St. • LOS ANGELES 33, The R. J. M. Company, 238-248 South Mission Rd. • **Illinois,** CHICAGO 8, Joseph T. Ryerson & Son, Inc., 16th and Rockwell Sts. • **Kentucky,** ASHLAND, Mansbach Steel Co., 19th St. and River Front • **Maryland,** BALTIMORE 2, Wm. G. Wetherall, Inc. 317 President St. • **New Mexico,** ALBUQUERQUE, Miller and Smith Mfg. Co., Inc., 500 Phoenix Ave., N. W. • **Ohio,** CLEVELAND 6, Mills-Wolf Steel Co., 12434 Cedar Rd. • **Oregon,** PORTLAND 4, J. E. Haseltine & Co., 115 S. W. Second Ave. • **Pennsylvania,** McKEES ROCKS, Follansbee Steel Co., 200 Bradley St. • **Quebec,** MONTREAL, Drummond, McCall & Co., Ltd. 930 Wellington St. • **Utah,** SALT LAKE CITY, Structural Steel & Forge Co., P. O. Box 300 • **Washington,** SEATTLE 4, Stack Steel & Supply Co., 500 Landers St. • SPOKANE 10, Union Iron Works, East 217 Montgomery Ave., P. O. Box 2135.

LUKENS

mer post is ROBERT C. BOWN, formerly assistant manager of the rectifier section.

The appointment of RICHARD GRUBER as its New England district manager, has been announced by Richardson Scale Company, engineers and manufacturers of automatic weighing and proportioning equipment and controls.

Prior to his new appointment, Mr. Gruber was a sales engineer with headquarters in the Cleveland area.

R. Gruber

J. B. Snoy

Twin Disc Clutch Company has established a new Transmission Engineering Department at its Hydraulic Division plant in Rockford, Ill.

This department will undertake the design of torque converter-equip the design of torque-converter-equipped power-shift transmissions for the industrial market.

Chief engineer of the new department is JOSEPH B. SNOY. He has had 15 years with General Motors Allison Division. In 1955 he was named chief transmission engineer at Westinghouse Electric Company, and a year later accepted a similar position at Rockford Clutch Division of Borg-Warner.

Three of Mr. Snoy's colleagues at Rockford Clutch, his brother, FREDERICK SNOY, BASIL WHITE, and MICHAEL GILL, have joined Twin Disc to work with him on transmission projects.

JOHN C. NELSON JR. has been named production control manager of all marine, industrial, and mining equipment manufacture at Lake Shore, Incorporated, Iron Mountain, Mich.

Prior to the new appointment, Mr. Nelson was in charge of the inventory control department, a post he had held since joining the company in 1951.

Mr. Nelson will have charge of production schedules for the company's line of deck machinery, including winches, cranes, and Siporters, as well as mining equipment, including mine cars, skips, skip-laders, and related items.

RAY N. WHEELOCK, 62, named director of Hercules Powder Company's Engineering Department in January, died recently in Wilmington, Del., after suffering a heart attack.

F. G. BEMIS of Boston was elected chairman of the board and JUDSON BEMIS of Minneapolis president and chief executive officer of the Bemis Bro. Bag Company.

The board also announced that C. W. AKIN of Minneapolis had been elected executive vice-president; R. V. SCOTT of St. Louis and B. L. WILLMORE of Boston, vice-presidents; and J. T. BRAXTAN of St. Louis, assistant secretary.

American Enka Corporation, a major producer of Tyrex tire yarn and high-tenacity rayon for industry, will move its Marketing Division headquarters to Enka, N.C. Headquarters will be located in the newly-constructed corporate office building —adjoining the company's plant and research center in Enka.

The Timken Roller Bearing Company's manufacturing operations in Canada, located at St. Thomas, Ont., have been renamed, "Canadian Timken, Division of The Timken Roller Bearing Company." This change is consistent with the Timken Company's international operations policy of identifying the manufacturing divisions of the company with the country in which it operates.

NEW HEAT PROTECTION

RAY-FOIL

THE PROTECTIVE HEAT CLOTH THAT SHIELDS WORKERS AND EQUIPMENT FROM RADIANT HEAT

PROTECTIVE CURTAINS

This amazing new material reflects heat as a mirror reflects light . . . offers maximum protection for personnel and equipment on production lines and maintenance operations, cuts costly breakdown time. RAY-FOIL is a highly flexible, extremely durable Aluminum Foil laminated to a Glass Cloth Fabric, Neoprene backing . . . or Asbestos Fabric. Available in curtains—PORTO-SCREEN, A Self Standing Portable Floor Screen — PROTEKOTE, The Protective Heat Garment.

PORTABLE SCREENS

WRITE for Literature, Prices and Swatches

FROMMELT

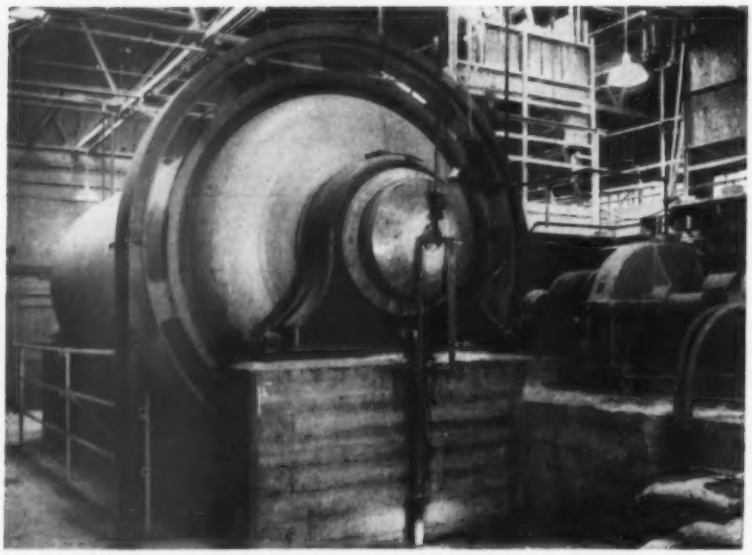
FROMMELT INDUSTRIES, Inc.

DUBUQUE, IOWA

A NAME TO REMEMBER IN APPROVED SAFETY PRODUCTS!

PROTECTIVE GARMENTS

Enter 195 on card, page 169



Hardinge 9' x 22' Pebble Tube Mill Wet Grinding Zircon in Open Circuit.

Hardinge TUBE MILLS...

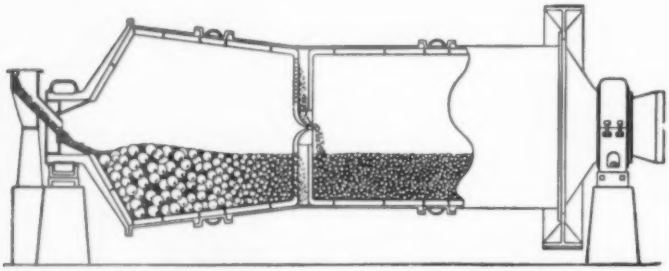
. . . for wet grinding
(in water or acid pulps)

Titanium Pigments
Manganese Dioxide
Diatomaceous Earth
Limestone

. . . for dry grinding

Fillers
Silica Flour
Gypsum
Carbon Black
Pigments
Cement materials

Regardless of the requirements, Hardinge Tube Mills are designed to meet specific needs. Available from 2 to 10 feet in diameter; 6 to 35 feet in length; single or multiple compartments; with acid proof lining of rubber, silica and porcelain. Complete specifications on request. Bulletin 18-B-8.



Tricone compartment Tube Mill with grate and lifters.

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA · 240 ARCH ST. · Main Office and Works
New York • Toronto • Chicago • Hibbing • Houston • Salt LakeCity • San Francisco • Birmingham • Jacksonville Beach

Enter 196 on card, page 169

H. J. MAYER has been installed as the Associated Equipment Distributors 42nd president by his fellow officers to fill the vacancy created by JEWEL A. BENSON'S death, noted here last month.

The new president is executive vice-president of Western Machinery Company, and general manager of Edward R. Bacon Company, both in San Francisco.

R. F. NEWLIN was moved to senior vice-president; and, with unanimous approval in a telegraph ballot, JOHN R. BORCHERT of Borchert-Ingersoll, Incorporated, was added to the 1960 Executive Committee.

KENNETH A. WILLIG has been appointed national sales manager for a newly formed Small Excavator Division at Harnischfeger Corp.

Mr. Willig will be primarily responsible for directing field sales personnel and P&H dealers in the marketing of all machines of 20-ton capacity and under. His headquarters will be at Harnischfeger's general offices in Milwaukee.

Mr. Willig has been associated with the company for the last three years and most recently, was sales representative in the Wisconsin district.

K. A. Willig

W. H. Tock

WILFRED H. TOCK has been appointed to the engineering staff of the Traylor Engineering and Manufacturing Division of Fuller Company. His assignment specifically will deal with the application of kilns, coolers, and dryers.

For the last two years, Mr. Tock has been a member of the engineering staff at Basic Incorporated in Cleveland, where he was engaged in the development of high-temperature kilns. From 1949 to 1957, he specialized in rotary kilns at Allis-Chalmers.

All Teeth Stay Sharper, Last Longer with

ROAD RIPPER TEETH *averaged 7 to 10 times more life after receiving protection with Tube Borium. Notice how tooth chisels down with wear.*

Stoody TUBE BORIUM!

Wear and loss of digging efficiency are common complaints on all types of teeth—*ditchers, power shovels, rippers, draglines, dredges, etc.* Hard-facing greatly prolongs useful life. But even so, each tooth can be made to last *far longer than ever before* and *retain its sharpness* by hard-facing with Stoody TUBE BORIUM!

Why is this one hard-facing alloy so superior on teeth? *No other hard metal equals TUBE BORIUM in straight abrasion resistance.* Its deposits are thickly peppered with tiny tungsten carbide particles. Wear is virtually defied by this hardest-of all man-made metals.

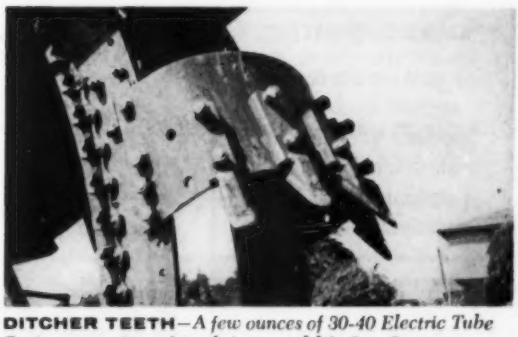
More expensive in first cost, Tube Borium shows excellent economy in overall service life, outlasting other materials many times over. And longevity is not your only benefit. Remember, one major cost of any hard-facing application is welding time. Use the best, Tube Borium, and you'll save several applications of less effective alloys besides eliminating needless downtime!

Your Stoody dealer (check the Yellow Pages of your phone book) will supply details, literature or recommendations. Ask about Tube Borium—or write direct.

SHOVEL TEETH *wore out in one 8-hour shift. A few beads of Tube Borium applied during noon break prolong life 6 or 8 full shifts. They are then repointed and hard-faced for further use.*

DRAG LINE TEETH *used in slag dump were hard-faced with Electric Tube Borium—outlasted unprotected teeth 9 to 12 times.*

TUBE BORIUM is available in stick form for oxy-acetylene or manual electric application. Also in continuous wires for automatic and semi-automatic electric application. Various mesh sizes for individual uses.

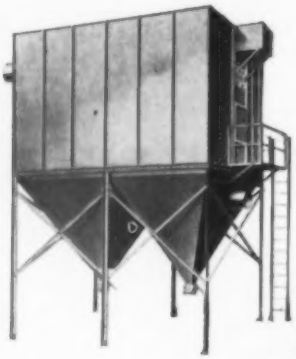


DITCHER TEETH—*A few ounces of 30-40 Electric Tube Borium on points of teeth increased life 6 to 8 times over factory originals.*

STOODY COMPANY

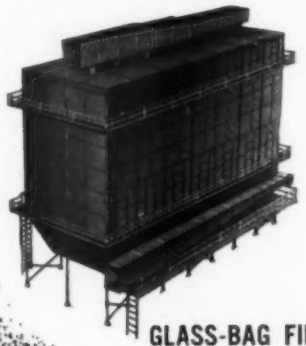
11940 East Slauson Avenue • Whittier, California

▶freedom from almost any dust



MULTI-BAG FILTERS

▶freedom from hot, corrosive dust



GLASS-BAG FILTERS

THE NEW PLANT DIMENSION...

freedom from dust

▶freedom from dust thru cyclonic collection

WHIRL-CLONES

▶freedom from small or local dust problems

UNI-FILTERS

BAG-HOUSE COLLECTORS

Dracco can also design, engineer and fabricate bag-house type collectors, where know-how in the application of qualified components is essential.

Freedom from dust is a new plant dimension that measures administrative excellence as well as production efficiency.

Advanced manufacturing techniques, coupled with a nation-wide campaign against air pollution, have established need for a new high order of dust control. The Dracco collectors shown here, backed by 40 years experience in dust control engineering, can prove invaluable in your fight for clean plants and clear skies.

A new 28-page brochure "FREEDOM FROM DUST" includes full technical and application data on Dracco's complete line of dry collection equipment. Write Dracco Division of Fuller Co., Harvard Avenue and East 116th Street, Cleveland 5, Ohio.

DRACCO *airstream* conveyors
dust control equipment

FULLER COMPANY

The appointment of ROBERT M. JOHNSON as assistant manager of its Foreign Sales Division was announced by officials of Fuller Company. Mr. Johnson will assume his new duties immediately.

An administrative assistant within the Fuller organization for the last ten years, Mr. Johnson will be responsible for co-ordination of foreign sales effort.

Prior to being named an administrative assistant to Fuller Co. in 1949, Mr. Johnson was from 1936 associated with Separation Process Co. in Catasauqua, at that time a Fuller subsidiary.

R. M. Johnson

D. F. Mahony

DANIEL F. MAHONY has been appointed assistant manager—Lubricant Development for Climax Molybdenum Company, a division of American Metal Climax.

In his new position, Mr. Mahony will further develop the markets for Climax's molybdenum disulfide grease additive, and promote technical and general line sales. He will also be exploring new markets for the additive in related fields.

The name of the Mouldings Division, H. K. Porter Company, Inc., has been changed to Coldform Division, according to C. L. HOLBERT, president. "The purpose of this change," Holbert said, "is to provide the division with a name that more adequately describes its services to modern industry."

The division's present capabilities include the production of cold finished structural and decorative parts and sub-assemblies using highly specialized roll forming, stretch bending, stamping, and welding processes. Basic materials used are stainless and cold rolled steels, aluminum, and brass.

Minneapolis-Moline Company has added around $3,000,000 in annual volume to its expanding manufacture of materials-handling equipment through the purchase of the fork lift truck business of Lamson Mobilift Corporation, Portland, Oreg.

Banks-Miller Supply Company, Huntington, W. Va., has been appointed as a franchised dealer of Baker trucks to serve the southern section of West Virginia and the surrounding areas in Ohio and Kentucky.

The Insley Manufacturing Corporation has announced the opening of a western regional office at Alhambra, California. J. RAY ELLIOTT, vice-president will be manager of the new regional office. All functions including sales, service, and parts will be provided for the following western states: Washington, Idaho, Montana, Oregon, Utah, California, New Mexico, Arizona, Colorado, Nevada, Wyoming, Alaska, and Hawaii. British Columbia is also included. District sales representatives include ED V. WALSH, Los Angeles, Calif., and J. L. LAMLEY, Olympia, Washington.

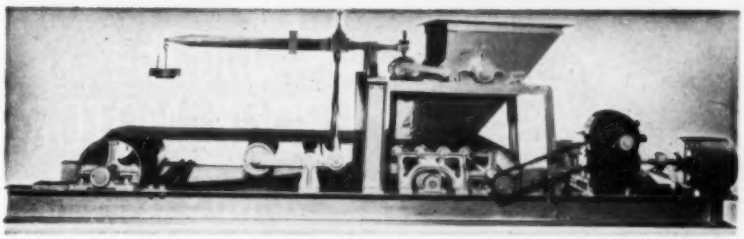
WILLARD E. SANVIK has been named a salesman in the industrial wholesaler division of Dayton Industrial Products Company, of Melrose Park, Ill., a division of The Dayton Rubber Company.

He will handle sales of the company's line of industrial V-belt drives and related power transmission belting and industrial hose in the Minneapolis, Minn. area.

DONALD S. GRAHAM, chief application engineer in the sales development department of Euclid Division of General Motors Corporation, passed away in his home in Cleveland, Ohio, in February.

BULK MATERIAL PROCESSORS DEMAND

SCHAFFER POIDOMETERS FOR SUPPLYING ACCURATE WEIGHT-DATA



• OVER 1600 NOW SERVING INDUSTRY •

BULK MATERIAL PROCESSORS favor these machines because they are versatile and supply precise information at various production stages.

Poidometers are easy to install and operate—they're designed and constructed for dependability and low-cost, long-term service.

They're available with total weight recorders, and control devices for showing and changing feed rate.

SCHAFFER POIDOMETER CO.
2828 SMALLMAN ST. PITTSBURGH 22, PA.

Enter 199 on card, page 169

The J. B. Ehrsam & Sons Manufacturing Company, of Enterprise, Kans., announces the appointment of CHARLES ANDREAS to succeed D. M. EHRSAM as manager of the company's Gypsum and Wallboard Machinery Division. The division office will remain at 385 New Brotherhood Bldg., Kansas City, Kans. Mr. Ehrsam will continue as consultant and as board chairman of the Ehrsam Company.

The Century Electric Company, St. Louis, Mo., manufacturers of motors and generators, has reorganized their national sales force into six major divisions.

Each of the divisions will be headed by a divisional sales manager, reporting directly to GEORGE HENDERSON, general sales manager, located in St. Louis.

GUNAR MOE has been appointed Northeast Division sales manager. He will have headquarters in New York.

FRED POWERS has been appointed sales manager of the Southwest Division, working out of St. Louis.

WILLIAM D. HELM was appointed sales manager of the Midwest Division. He will maintain an office in Chicago.

JAMES H. BOLTON was assigned the job of sales manager, North Central Division, and will be located in Cleveland.

JAMES S. SMITH was appointed sales manager of the Southeast Division, with offices in Baltimore.

The Western Division will report directly to Mr. Henderson, the general sales manager.

ADRIEN F. BUSICK JR., formerly executive vice-president and general manager, is now president and general manager of the Marion Power Shovel Company, division of Universal Marion Corporation. The presidency of the division had been vacant since the resignation of the late MILTON T. SMITH in July of 1958. DAVID REICH was appointed assistant to JAMES MULLANEY, president of Universal Marion Corp. Mr. Reich retains his position of vice-president—administration of the division. In his new capacity, he will act as liaison officer between the division and Universal Marion Corp.

Worthington Corporation is establishing a new Southern Resale Region, with R. N. FRANZ, former Central Region resale manager, as manager. Headquarters will be in

R. N. Franz

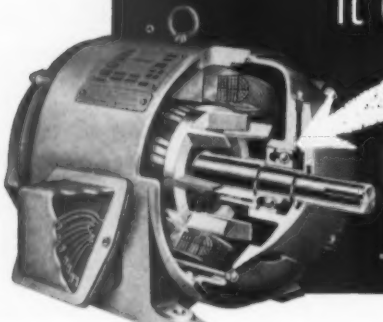
F. J. Reardon

Atlanta, and the territory will include the sales territories of Atlanta, New Orleans, Houston, Dallas, and Tulsa.

F. J. REARDON, who had been New England construction equipment representative, was appointed Central Region resale manager, succeeding Mr. Franz.

Minneapolis-Moline Company has added around $3,000,000 in annual volume to its expanding manufacture of materials-handling equipment through the purchase of the fork lift truck business of Lamson Mobilift Corporation, Portland, Oreg.

If it doesn't have it here—
it doesn't have it!



and the
BROOK MOTOR
has it!

MANY MOTORS look practically alike on the outside, but it's what is inside that counts. There is no motor with better windings or more ample bearings—few motors compare favorably. Yet, the Brook Motor costs less, because of volume production, modern techniques, distribution in 76 countries and a realistic pricing policy. Brook Motors have established excellent performance records for over 56 years in every industry using a.c. motors. From 1 to 600 H.P. Send for literature.

SINCE 1904
BROOK ELECTRIC MOTORS

world's most respected motor

BROOK MOTOR CORPORATION
3302-04 W. Peterson Ave., Chicago 45, Illinois
Factory Representatives, Warehouses, Dealers in Principal Cities.
In Canada: Brook Electric Motors of Canada, Ltd.
250 University Ave., Toronto, Canada

Enter 200 on card, page 169

ATTENTION!

Administrative and Production Executives

See page 166 for information about how to reserve your copy of the 1960 Pit and Quarry Handbook.

SPECIAL REPORT TO CATERPILLAR OWNERS:

CAT CATERPILLAR

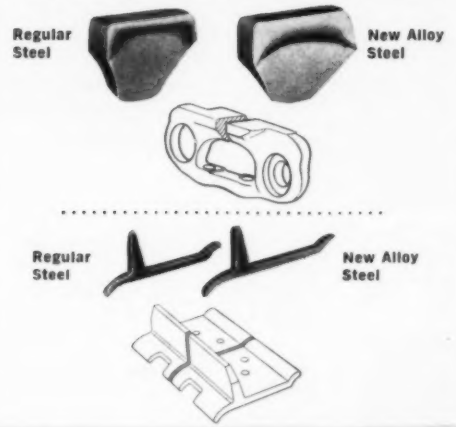
Parts you can trust
...cost less per hour

OPTIONAL TRACK GROUPS

up-date D9 or D8 Tractors for longer undercarriage wear

Now, two types of track groups are available for older model D9 and D8 Tractors . . . regular and optional, allowing you to tailor your undercarriage parts to meet job conditions.

Lighter tones at top of etched cutaways show depth of special hardness in wear zones.



REGULAR track parts are made from durable steel. They're heavy-duty, long-lived, special-hardened to resist wear.

OPTIONAL track parts are equivalent to those used on current production model tractors. The links and shoes are made from Caterpillar's new alloy steel that is hardened much *deeper* than regular steel. Link rails are hardened twice as deep. Shoe grousers are hardened 400% deeper. The new alloy steel also provides greater strength with more impact resistance.

MORE METAL WHERE IT COUNTS. Optional components are king size. Every part is beefed up and made bigger with more *hardened* steel in wear areas.

BORALLOY "HUNTING TOOTH" SPROCKETS are another new feature of the optional groups. Every other tooth is used in one revolution, alternate teeth being picked up the next revolution. This alternation means that teeth contact the bushings only *half as many times* as do regular sprocket teeth. More important are the teeth themselves—they're *machined* for exact fit with the big bushings. This greatly extends bushing life.

COMPARE regular and optional track components:

	Pitch	Pins O.D.	Bushings O.D.	Track shoe bolts and nuts	Sprocket
D8	regular 8 inches	1 3/4 inches	2 3/4 inches	3/4 inch	14 tooth
	optional 9 inches	2 inches	3 inches	7/8 inch	25 tooth
D9	regular 9 inches	2 inches	3 3/16 inches	7/8 inch	28 tooth
	optional 10 1/4 inches	2 1/4 inches	3 3/8 inches	1 inch	25 tooth

HOW MUCH MORE LIFE? Variation in the length of track life occurs because components have different wear rates under various soil and job conditions. In sand, pins and bushings wear faster. In rock, shoes and links wear faster.

ON-THE-JOB TESTS confirm that the new optional track components are giving up to 40% more life than the regular parts. On many applications, you can expect even greater wear life.

CORRECT TRACK GROUP SELECTION IS IMPORTANT. It depends on job types and conditions. Let your Caterpillar Dealer analyze your track needs. He'll recommend the correct components to help you get maximum life at the most reasonable investment. Call him soon.

SERVICE TIP: **FREE!** Handy reference for ordering track options. "New Options for D9 and D8 Tractors" includes part numbers that are used to adapt to your older models. Pick up a copy at your Caterpillar Dealer's.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Caterpillar Tractor Co., General Offices
Peoria, Ill., U.S.A.

Brooks Industrial Sales, Incorporated, Sun Prairie, Wis., has been appointed a distributor in Wisconsin for the complete line of construction machinery manufactured by the South Bend Division of Curtiss-Wright Corporation.

A. B. WALKER has been appointed assistant director of research and development at Research-Cottrell, Incorporated, Bound Brook, N. J. Dr. H. J. WHITE, previously director, has accepted an appointment as professor of applied science at Portland State College, Oreg. Mr. Walker joined Research-Cottrell in 1947, as a member of its engineering staff. Dr. White will continue to serve as a consultant, and remain a member of the board of directors.

WILLIAM V. SHAKESPEARE has been appointed president of Cincinnati Rubber Manufacturing Company, Division of Thor Power Tool Company, succeeding L. P. DARNELL, who retired after four years as president.

Mr. Shakespeare joined the Thor organization in 1936, following graduation from Notre Dame, where he attained All-American football recognition as a halfback in 1935.

S. J. Coffey

W. V. Shakespeare

S. J. (BUD) COFFEY has been appointed vice-president and sales manager for Westfall Equipment Company, Portland, Oreg. Mr. Coffey was formerly head of the West Coast off-highway equipment program of the Mack Truck Company, San Francisco.

Westfall manufactures heavy, pneumatic-tired, off-highway tractors. The new eppointment is the result of the company's expanded sales activities.

F. G. BEMIS JR., manager of the Bemis Bro. Bag Company plant in East Pepperell, Mass., has been appointed director of allied operations for the company, it was announced by C. W. Akin, the company's executive vice-president.

Mr. Bemis will be succeeded as manager at East Pepperell by WALTER I. RODGERS, who has been serving as assistant to the manager.

As director of allied operations, Mr. Bemis will move to the general offices in Boston and will be responsible for the operation of the company's Visinet mill, paper specialty, and plastic packaging plants.

PERRY I. NAGLE, founder and president of Nagle Pump, Incorporated, died recently in Chicago Heights, Ill. The company will continue as before, under the supervision of Mr. Nagle's son, JAMES NAGLE, sales manager.

The Gates Rubber Co. "Outstanding Distribution" award has been accorded Woodbury and Co., veteran Portland industrial suppliers and steel distribution firm.

Aikins Tractor Company is the dealer for Eimco tractors in Del Nort, Humboldt, and Mendocino counties in California, and in Curry county in Oregon.

GEORGE FRETLAND, who had been the firm's branch manager in Ukiah, Calif., is now sales manager.

GRIPPER EDGES ON VIBRATING SCREEN SECTIONS

Is the gripper or flange design right for your vibrating equipment? Are the flanges held parallel? Is the radius of the flange hook correct? Does the cloth lie flat? Are the ledges clean? Is the tension drawn on the screen section squarely? Check these points carefully to correct gripper edge problems. Call Cleveland Wire Cloth for valuable assistance and top quality vibrating screen section cloth.

Write for ***FREE*** maintenance-reducing check sheet today.

THE CLEVELAND WIRE CLOTH & MFG. CO.

3574 EAST 78th STREET CLEVELAND 5, OHIO

Enter 202 on card, page 169

CHECK LISTING of available TECHNICAL LITERATURE, p. 169.

The ML-157 (shown above) has a 7000-lb. carrying capacity. Lorain also builds the ML-153 with 6000-lb. carrying capacity.

MOTO-LOADER® BALANCED* THREE WAYS FOR FAST CYCLES . . . BIG OUTPUT

1. ***WEIGHT BALANCE.** Lorain puts the center of gravity low, distributes the weight on heavy-duty axles for ground hugging travel without bounce or teeter. The product of true engineered balance, the ML-157 travels with its load at optimum height to save dump time at the truck.
2. ***CONTROL BALANCE** features one-foot travel and speed control for coordinated work flow. Using "no-hands" direction selectors, operator keeps one hand on the wheel at all times, uses other hand for other operations. Finger-tip controls require few motions for easy operation.
3. ***POWER BALANCE.** Engine size, hydraulic capacity and multi-speed, power-shifted transmission provide the right degree of power for positive crowding and digging, smooth travel, fast loading. No wasted horsepower, no wheel spinning. All the power is used for work.

PLUS ALL THE FEATURES NEEDED FOR BIG PRODUCTION • Power booster steering • Torque converter • "Safety" lift arms • Heavier, one-piece frame • Four-wheel drive • Four-wheel hydraulic brakes • Shock absorbing, planetary wheel hubs • *See your Lorain distributor.*

One-foot travel control boosts payloads . . . frees operator's hands for steering, bucket control and other operations. By pivoting his foot between two adjacent pedals, operator controls direction—forward and reverse. Speed is controlled by depressing pedal further.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN® ON THE MOVE

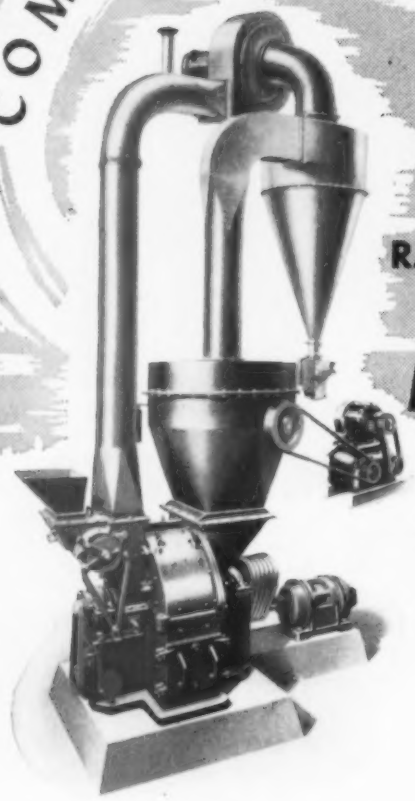
PLANTS: In Lorain, Elyria and Bucyrus, Ohio . . . **PRODUCTS:** Power shovels, cranes, draglines, clamshells, and hoes on crawlers from ⅜- to 2½-yard capacity • Cranes from 7 to 80 tons . . . on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in 6000-lb. and 7000-lb. carrying capacity . . . **OUTLETS:** Lorain products sold and serviced by 249 distributor outlets throughout the world.

COMPLETE CYCLE OF OPERATIONS

GRINDING
BLENDING
SEPARATING
CONVEYING
DRYING

WITH THIS AUTOMATIC UNIT

RAYMOND
IMP
MILL



The Raymond Imp Mill with Whizzer Air Separation is a general utility mill for pulverizing soft non-metallics, chemicals and manufactured products. As a compact integrated unit, it provides a clean dust-free system for reducing the material and obtaining a complete and thorough intermixture of the ingredients in finely powdered form.

It is used for the economical production of clays, phosphate materials, synthetic resins, pigments, and many specialty products. It is well suited for making different grades or changing from one material to another. Adequate access doors are provided for easy inspection or cleaning.

Imp Mills are built in several sizes to meet the capacity requirements of small and medium plants. They are economical to install, simple in operation and control with a wide range of application.

Available with Flash Drying accessories for removing moisture while pulverizing—the modern low-cost method of handling moisture-laden materials.

Write for Raymond IMP MILL Bulletin No. 87

COMBUSTION ENGINEERING, INC.
Raymond Division

1122 W. Blackhawk Street
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

A case history of Bemis service that could mean a lot to you

Our principal business, of course, is to sell bags in any honorable way.

But we much prefer to sell them through service, such as we have had the opportunity to render over the years to General Material Company, St. Louis.

The General Material–Bemis case history, related chronologically here, shows some of the many ways in which Bemis is able and anxious to work with customers:

1952 General Material Company, a ready-mix business packaging its product under the trade name "Pree-Mix," is launched. A Bemis specialist advises the young company on bag construction and design, and assists in setting up a packing line.

1956 General Material outgrows initial plant, constructs new plant with much greater capacity. To handle the increased output, Bemis Packaging Service representatives work with company officials and install complete Bemis packing line: Bemis Gravity Packer, Vee-Trof Conveyor and Bemis Sewing Machine Pedestal. Mr. Martin W. Melican, plant superintendent, states that "the use of the Bemis Gravity Packer has been instrumental in doubling the output of our products."

1960 Now an established company, General Material still receives close personal attention from Bemis multiwall specialist who keeps Mr. Melican and others informed of such new developments as Bemis Extensible Multiwalls. This close personal attention is typical of Bemis service.

This case history deals with one specialized phase of the rock products industry—but it indicates the wide range of facilities, technical skills, and packaging experience that Bemis makes available to all customers. If you would like to discuss your own packaging operation with a Bemis man, write today.

Where flexible packaging ideas are born

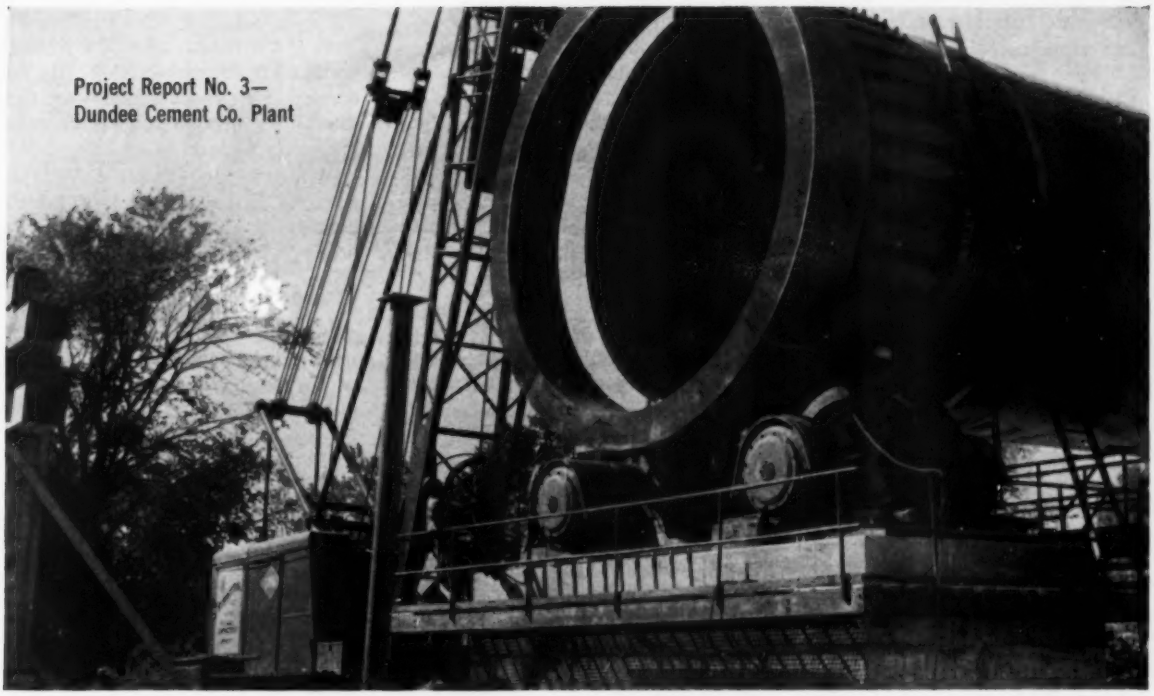
GENERAL OFFICES 408-Y PINE STREET, ST. LOUIS 2 • SALES OFFICES IN PRINCIPAL CITIES

Traylor-Made . . . means rugged dependability in heavy machinery. 60 years of industrial engineering experience goes into our ROTARY KILNS, PRIMARY and SECONDARY GYRATORY CRUSHERS, JAW CRUSHERS, APRON FEEDERS, BALL MILLS.

write for bulletins, giving complete information.

TRAYLOR ENGINEERING & MANUFACTURING
DIVISION OF FULLER COMPANY
1535 MILL STREET, ALLENTOWN, PA.

TGA I



With ease and efficiency, Darin & Armstrong's crawler crane assembles one of the massive kilns. Kilns measure 16' 6" x 15' x 16' x 460'.

NORTH AMERICA'S LARGEST KILNS
help make Dundee plant one of most efficient ever built

The remarkable efficiency of the Dundee Cement Plant is best illustrated by this fact: from just 2 kilns and 5 mills the plant can produce 5 million barrels of cement a year.

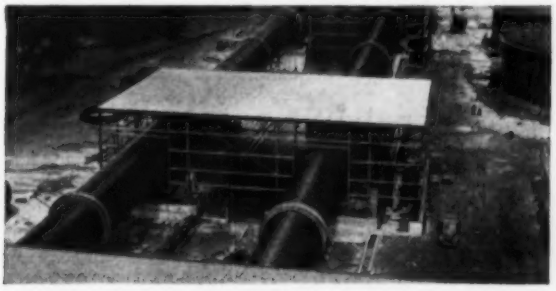
Another unusual feature of the Dundee plant is its ability to double production capacity anytime with only a slight addition of machinery—in space already provided—and a minimum extension of existing buildings.

Darin & Armstrong has met and solved all problems presented by the plant's unique design, while maintaining the erection schedule, *without overtime.*

This picture report covers the kiln installations.

(for Project Report #2 see February issue)

First kiln installed. Concentration of huge machinery and buildings in small area made Darin & Armstrong's job more difficult, but contributes to plant's efficiency.



Kilns nearing completion. Each will be rotated by a 250-hp. motor at 1 r.p.m. Tremendous machinery size is characteristic of entire plant. Mills and coolers are the biggest in the world.

DARIN & ARMSTRONG, INC.

GENERAL CONTRACTORS

Chicago 38, Ill. DETROIT 38, MICH. Cincinnati 18, Ohio

Washington Newsletter

(Continued from page 11)

Washington and California, where the ceilings are substantially higher. In the search for mortgage money in the low-ceiling states, it is no longer very worth while to go to the lenders who have the opportunity for national distribution. This leaves only the local lenders in the picture—for the most part, savings and loan associations generally restricted to housing loans in their local areas.

These associations have their own problems. Since they are limited to lending on such relatively low return investments, they, in turn, are unable to offer high interest rates to their depositors. This means that they are unlikely to obtain a continuing and increasing flow of such deposits.

The combined influence of these factors is certainly a slow-down in housing. Washington analysts are beginning to regard even the Prudential's figure as higher than we are likely to find by the end of 1960.

The Fed Fights Back

Last month we reported in this department on the political issue which the Democrats were trying to make out of the rate of economic growth. The principal target of their criticism was the Federal Reserve Board's monetary policy. Apparently, this criticism struck an especially sensitive nerve at the Federal Reserve Board. Almost immediately, a rash of letters, speeches, and articles by Federal Reserve Board officials appeared, defending the policy of that board.

William McChesney Martin Jr., chairman, Board of Governors of the Federal Reserve System, appeared before the Joint Economic Committee on February 2, 1960. That he was clearly on the defensive is obvious from his statement: "I want to emphasize again that the Federal Reserve System wants low, and not high interest rates; it wants as low a level of interest rates as is consonant with sufficient savings to finance the investment necessary for desirable and rapid economic growth."

He attempted, thereafter, to shift the emphasis from high consumption and low unemployment to high volume of savings and investments. He went on to say, "We cannot say that a steadily swelling stream of savings and investments is the only essential for satisfactory growth; but, especially in a country where the natural resources are already highly developed, it is a vital element."

In defense of the fact that we do have a relatively high rate of growth in any event, Mr. Martin pointed out that the Federal Reserve Board had recently revised its production index. That revised index shows that since 1947 industrial output has grown 4.1 percent per year as compared with a 1.7 percent increase in population.

"This is a growth in real industrial output *per capita* of over 2 percent per year," Mr. Martin emphasized. "In other words, we are producing 31 percent more industrial products for every man, woman, and child in America than we were at the beginning of the period. Output per industrial worker has increased even more rapidly—at the rate of 3.7 percent per annum over the same period."

While arguing that the Federal Reserve Board's monetary policy contributes to industrial growth by helping to maintain a stable dollar, he argued that this was only one of the factors. Among the others, he included balanced and sustained demand for labor and for the products of business, improvement in technology and skills, adequate capital formation based on voluntary savings, greater mobility of resources, and sufficient flexibility of industrial prices. He did not deny that the achievement of a stable price level would probably involve some increases in unemployment and a reduction in consumer demand.

At the same time, a similar defense, made by Clay J. Anderson, economic adviser to the Federal Reserve Bank of Philadelphia, included an almost total denial that monetary strength retards business expansion or the absorption of the unemployed. His analysis was along the lines that such unemployment as we have is, for the most part, of workers between jobs or seasonal or, at worst, technological, in that it results from changing production processing. None of these could, in his view, be affected by monetary policy.

It looks now as though the Democrats may have hit political pay dirt with this apparently complex issue. Certainly the Republicans seem to think so.

Cement Truck Haulage Setup To Serve Lehigh Valley Plants

Construction has begun on a $140,000 cement hauling depot near Northhampton, Pa., for E. Brooke Matlack, Inc., of Philadelphia. The trucking company is building the terminal on a tract leased from Dragon Cement Company, near the plant of Universal Atlas Cement Division of U. S. Steel Company. The terminal will house nearly 100 trucks.

The firm proposes to haul bulk cement within a 200-mile radius of the depot, which is in the Lehigh Valley. Several major cement manufacturers have both plants and storage silo depots in this area.

About 21 railroads have opposed the Interstate Commerce Commission's approval of the Matlack permit, and also other trucking permits.

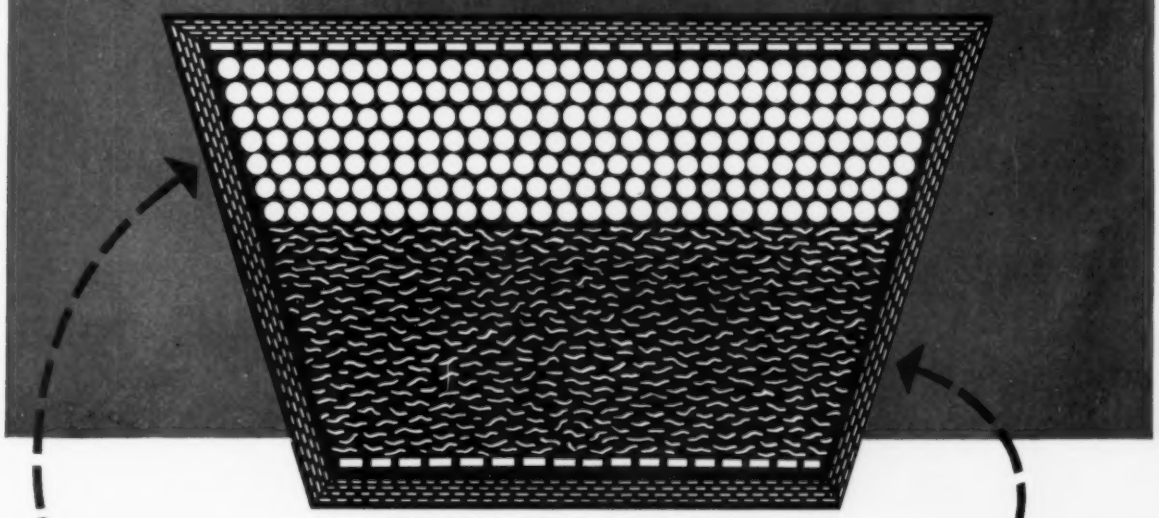
Canadian Cement Shipments Reach All-Time High in 1959

Cement shipments in 1959 reported by Canadian manufacturers reached an all-time high of 6,285,389 tons—up from 6,157,817 tons in 1958.

The Dominion Bureau of Statistics, Ottawa, also reports that December, 1959, shipments totaled 284,720 tons — up from 234,420 tons in December, 1958. Year-end stocks declined to 597,535 tons from 613,434 tons in 1958.

United States Gypsum Company established the best safety record in its history during 1959. According to E. C. Beuthin, manager-safety, the firm achieved an excellent 1.8 lost-time frequency rating as measured by American Standards Association, with 34 of 59 plants enjoying perfect records.

Only BOSTRON V-Belts



are made with...

BOSTRON Tensile Members PLUS NEOPRENE with FIBER-DISPERSED Stock

GREATER STABILITY — Changes in humidity — and the resulting moisture regain — often mean a matching problem with ordinary V-Belts. The moisture regain of BOSTRON is low — 0.4% — or ½₀th that of the conventional reinforcing fiber. This means far less time spent in matching, and lower belt inventory too.

HIGHER STRENGTH — Stronger belts can withstand more shock loading, need less maintenance. BOSTRON is approximately 40% stronger than the conventional fiber used in V-Belts.

STRETCH RESISTANCE — V-Belts reinforced with BOSTRON have low stretch. BOSTRON is inherently stretch-resistant and the cords are put through a special heat and tensioning process to further minimize stretch. Thus, belts reinforced with BOSTRON show comparatively little growth — even after many months of continued operation.

GREATER RESISTANCE to oils, heat, abrasion, chemicals and ozone is provided by Neoprene.

HIGH CROSS-WISE RIGIDITY is provided by the closely-packed, straight-line formation of the fibers in the compression member.

EXCEPTIONAL LENGTH-WISE FLEXIBILITY is provided by the virtually frictionless positioning of fibers.

EXTRA SUPPORT for the tensile members during shock-load impact and during normal operation.

The industry's most advanced developments are now standard in the entire BOSTON Multiple V-Belt line!

● CUT DOWN MAINTENANCE ● MAINTAIN SMALLER INVENTORY ● SAVE MATCHING TIME ● SAVE TAKE-UP TIME

BOSTON

BOSTON WOVEN HOSE & RUBBER COMPANY
DIV. OF AMERICAN BILTRITE RUBBER CO., INC.
BOSTON 3, MASS.

American 500 Series Dragline loading out gravel.

AMERICANS ARE PIT-PROVEN!

American cranes and excavators are pit-proven for every kind of sand, gravel and rock operation. Built for continuous operation on the most punishing jobs, these rugged machines combine weight, power and low center of gravity to give you 100% efficiency. Performance is what you want and that's what you get from any of American's full line of heavy-duty cranes and excavators.

American 300 Series Shovel feeding portable crushing plant.

American cranes and excavators are noted for trouble-free, high volume production on every job. Notable, too, is the all-around, first rate service American owners receive from American distributors. From machine operation to job application, your American distributor will be glad to show you how American machines will make your work more profitable.

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

EXCAVATORS-CRANES
to 2 yds.-60 tons
LOCOMOTIVE CRANES
to 130 tons

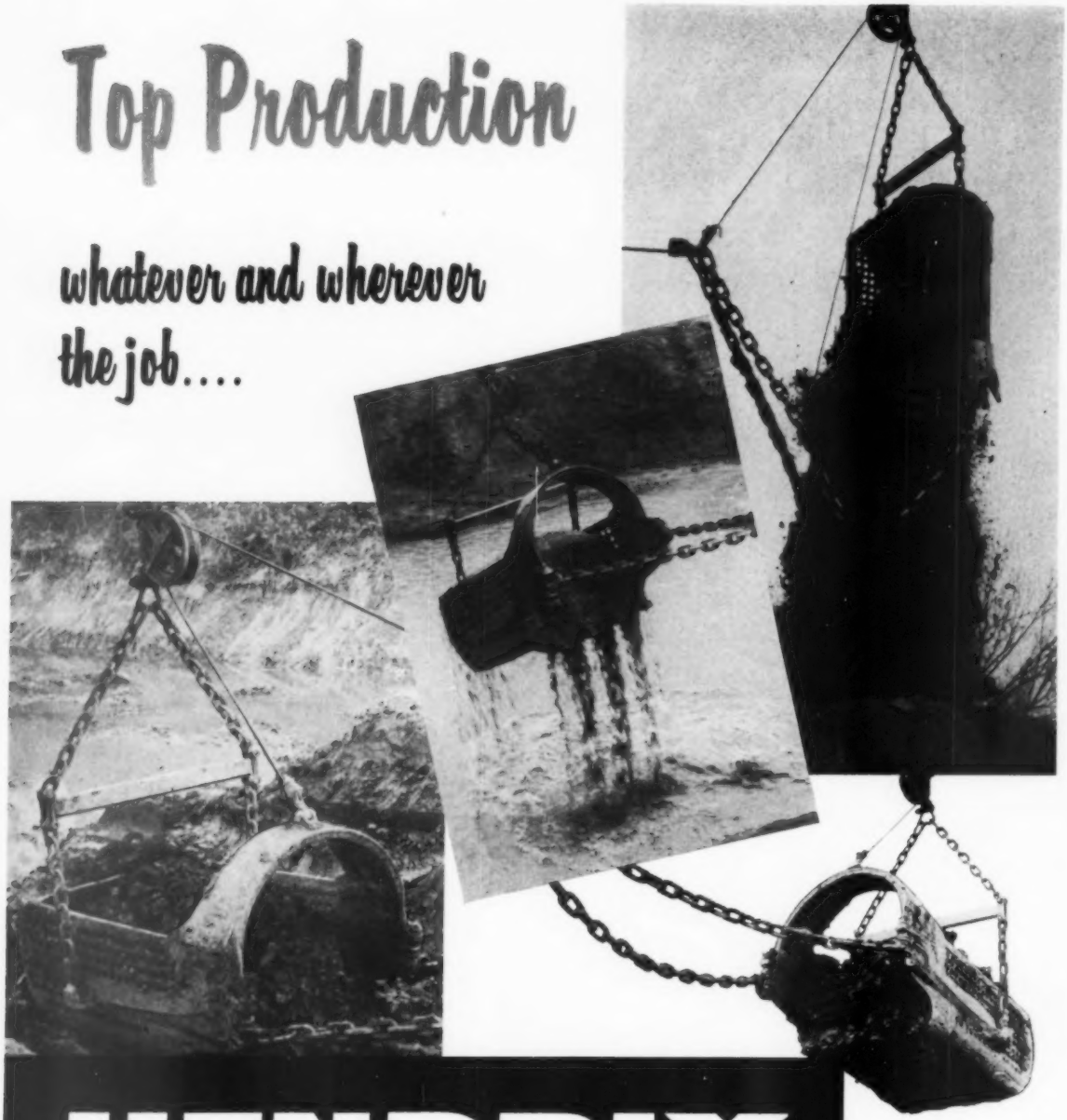
DERRICKS-HOISTS
to 800 tons
REVOLVER CRANES
to 400 tons

CROSBY-LAUGHLIN
DIVISION
Forged fittings
for wire rope-chain

Enter 210 on card, page 169

Top Production

whatever and wherever the job....



HENDRIX
DRAGLINE BUCKETS

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

HENDRIX MANUFACTURING COMPANY, Inc.
MANSFIELD, LOUISIANA

Hendrix Lightweight DRAGLINE BUCKETS

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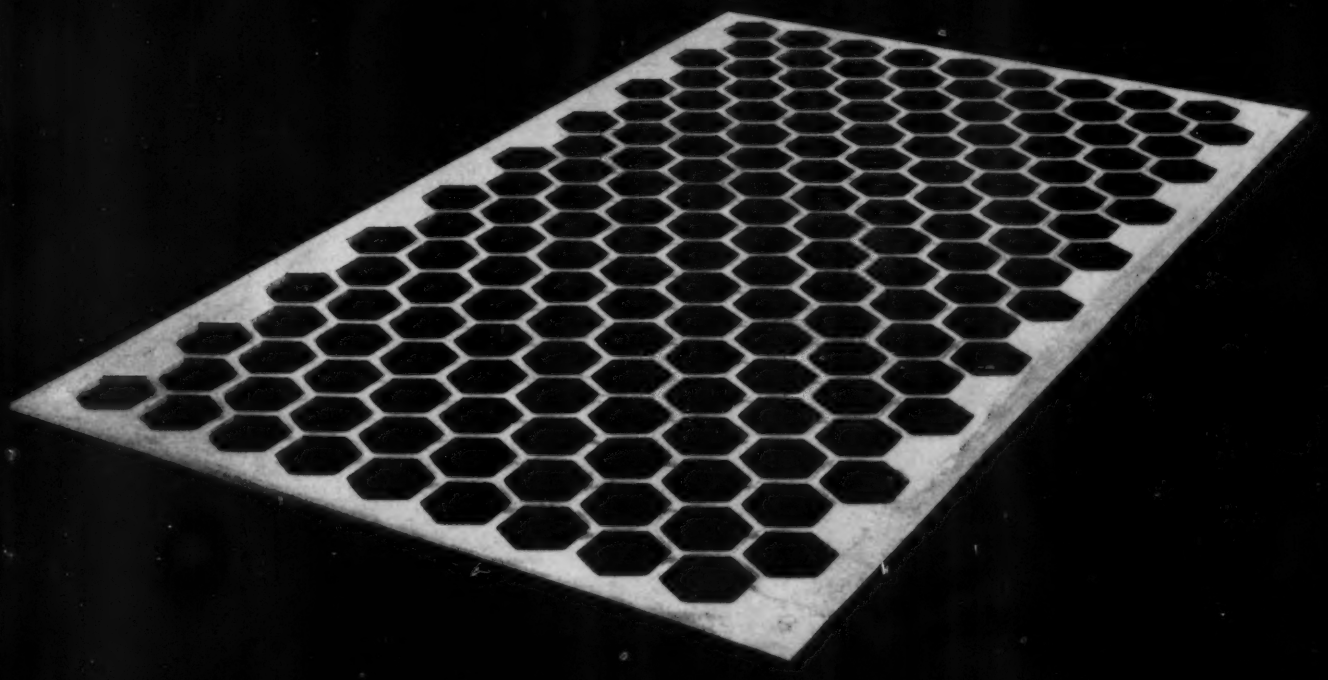
Enter 213 on card, page 169 →

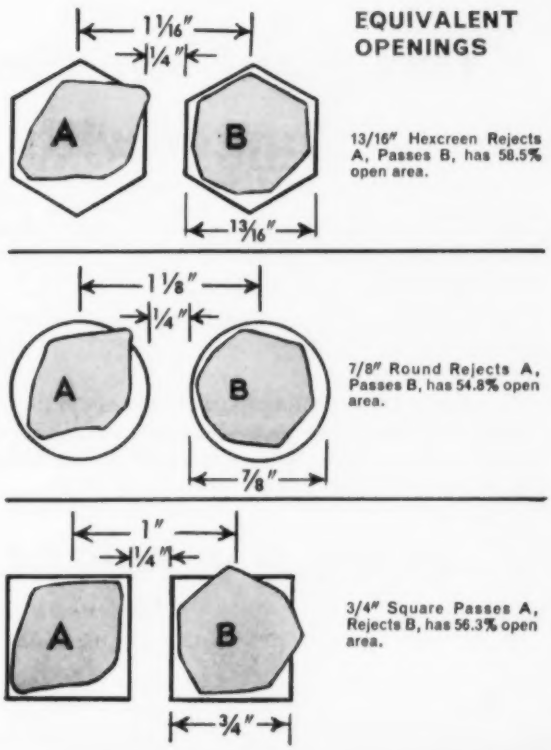


For rock products screening...

Cross HEXCREEN* gives more uniform sizing, greater capacity

If you have been using woven wire screens or perforated metal screens with square or round openings, you will find that you can increase capacity, get more accurate sizing with CROSS HEXCREEN. The unique configuration of CROSS HEXCREEN (hexagonal shaped perforations), gives you more open area and less weight than equivalent square or round hole screens, yet provides the sizing accuracy of round type (see example at right).

CROSS HEXCREEN is specially designed for sizing granular products such as coal, coke, sand, gravel, crushed stone, slag, limestone, minerals and ores. CROSS perforated steel screens, made from long wearing CROSS Special Analysis Steel, are available in a wide range of sizes with uniformly spaced square, hexagon or round perforations, staggered for increased capacity and efficiency. For additional information on CROSS Perforated Screens write for complete catalog. * T.M.

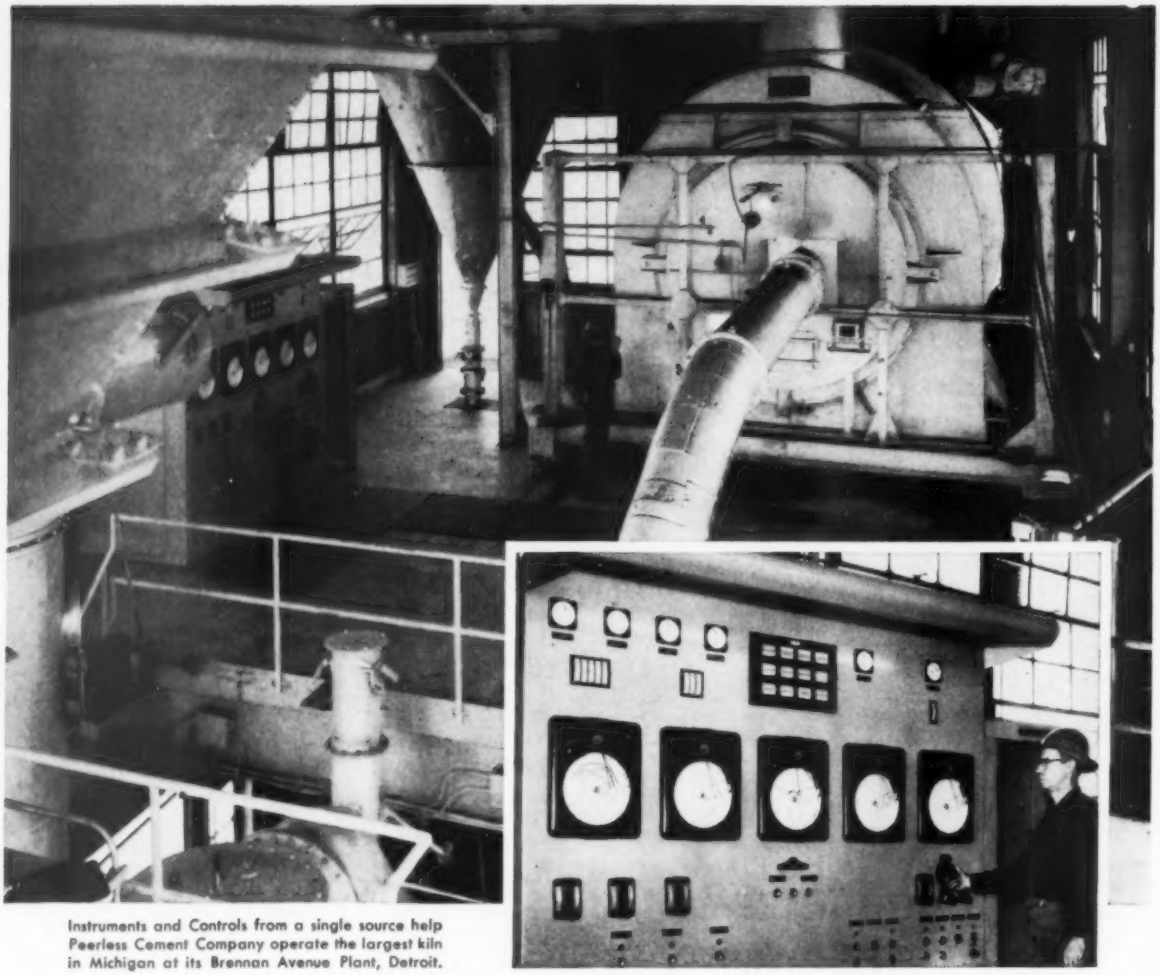


NS NATIONAL-STANDARD COMPANY

Cross Perforated Metals

NATIONAL-STANDARD COMPANY

Carbondale, Pa.



Instruments and Controls from a single source help Peerless Cement Company operate the largest kiln in Michigan at its Brennan Avenue Plant, Detroit.

This giant kiln gives peak performance <u>longer</u> with Bailey Controls

The Peerless Cement Company of Detroit demands maximum capacity, uniform production and low fuel rate from its largest kiln . . . and Peerless gets it!

They do it with a Bailey Control System that gives them complete control of combustion, clinker cooler, and other kiln variables.

The system keeps continuous chart records of 11 important variables, including temperatures, drafts, air flow, kiln speed, fan speed, % oxygen, and % combustibles.

All this is done so dependably that the kiln often makes week-long runs without being touched.

All recording receivers in the Bailey System are plug-in components—easily removed, regrouped, or replaced to meet changing requirements. Additional records are added simply by plugging in receivers on existing recorder cases. Your Bailey Engineer can help you plan for peak performance — call him or write for your Bailey Kiln Control Folder.

C115-1

BAILEY METER COMPANY

1051 IVANHOE ROAD • CLEVELAND 10, OHIO

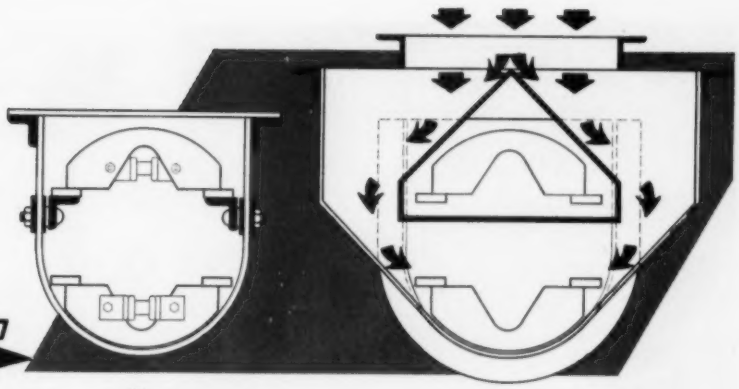
In Canada—Bailey Meter Company Limited, Montreal

BAILEY METERS

EHRSAM OFFERS

more than

"JUST A CONVEYOR"...



EHRSAM

DRACON...first

FIELD TESTED AND
PROVEN SELF-CLEANING FLIGHT CONVEYOR

The DRACON chain-and-flight conveyor is proving to be the answer to many a tough conveying problem. This highly versatile conveyor is self-cleaning, compact, requires little maintenance, has a low horsepower/capacity ratio, and is economical to buy and operate.

Continuous field testing and engineering research since the pilot model was introduced in 1949 have put the DRACON at the top of the class. Outstanding flight quality has been achieved by thousands of hours of grueling testing of various materials and contours.

For more information on how the DRACON conveyor can handle your conveying work more efficiently and economically, see your Ehrsam representative or write for our free DRACON brochure.

The J. B. Ehrsam & Sons Mfg. Co.
ENTERPRISE • KANSAS

BRANCH OFFICES: ATLANTA, GEORGIA; CHICAGO, ILLINOIS; DENVER, COLORADO; DES MOINES, IOWA; FORT WORTH, TEXAS; HASTINGS, NEBRASKA; KANSAS CITY, KANSAS; PHILADELPHIA, PENNSYLVANIA; PHOENIX, ARIZONA; SAN FRANCISCO, CALIFORNIA.

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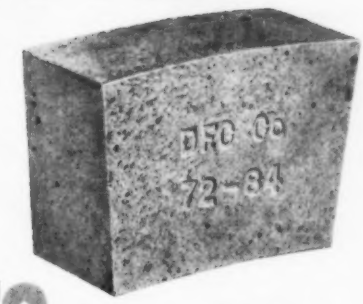
ROTARY kiln liners



that last & last... at lower cost

From hot to cold, DFC Kiln Liners are matched to meet your requirements for a better job: 70% alumina for hot zone, 50% alumina for intermediate zone, High Heat Duty for cold and cooler zones. You profit from our experience with a product noted for uniformity because it's dry-pressed. Other specific advantages are high strength, dimensional stability, resistance to abrasion and spalling. Under the most severe service conditions, DFC means dependability!

Denver Fire Clay Company
DENVER • SALT LAKE CITY • NEW YORK

Use in these installations:

Cement Kilns
Lime Kilns
Fertilizer Kilns
Lightweight Aggregate Kilns

DFC manufacturers a complete line of mortars for laying or grouting of kiln liners.

Latite: Both wet and dry types, Super Duty air-set high temperature bonding mortar.

Multite: High alumina, dry type, air-set high temperature bonding mortar.

Hifire Bond: Super Duty heat-set high temperature bonding mortar.

DFC companion products include a complete line of refractories: high heat duty firebrick, plastic firebrick, castables, gunning and ramming mixes and insulating castables.

When you have a refractory problem, consult DFC—at any time!

DF 0-13

The DENVER FIRE CLAY COMPANY
3033 Blake Street, Denver 17, Colorado

Please send further information on DFC refractories for (type of installation):

Name:.....
Company:.....
Address:.....
City.....Zone.....State.....

Enter 215-B on card, page 169

Another size reduction problem solved by Hammermills, Inc.

Bulldog Non-Clog Hammermill

Crushes 375 to 400 tons wet limestone per hour

Limestone fed to this primary Hammermill at a new Midwestern cement plant contains 12% silica. It is mixed with clay and is high in moisture. The Bulldog Non-Clog Hammermill crushes this material at a rate of 375 to 400 tons per hour with a power consumption of 600 h.p.

Bulldog Non-Clog Hammermills are known throughout the industry for their ability to handle tough jobs. They'll give more capacity per horsepower. They require less maintenance.

Hammermills, Inc. can help you lower costs and increase your capacity. For the names of the Hammermills representative in New York, Chicago, St. Louis, Toledo, Dallas, Denver, Los Angeles, and Melbourne, Fla., simply write us.

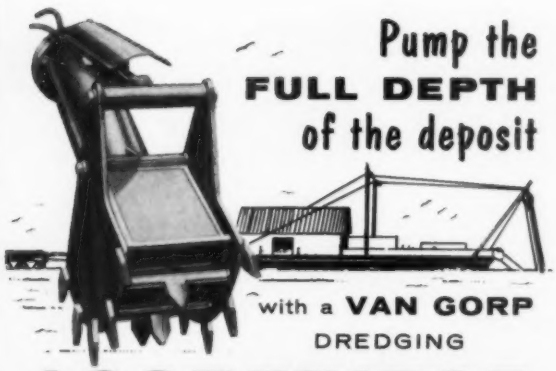
Manufacturers of Hammermills for primary and secondary crushing • Impactors • Jaw Crushers • Roll Crushers • Cone Crushers • Wobbler Feeders • Apron Feeders

HAMMERMILLS, INC.

Subsidiary of PETTIBONE Mulliken Corp

625 C Avenue N. W., Cedar Rapids, Iowa

Enter 216-A on card, page 169



Pump the FULL DEPTH of the deposit

with a **VAN GORP** DREDGING

AGGRETATOR

(SIZES AVAILABLE FOR 6-8-10-12 INCH SUCTION LINES)

- *Cuts through clay seams*
- *Loosens cemented deposits*
- *Dislodges large rocks*

No one knows how many tons of material are lost each year in dredging operations because of bad pumping conditions. However, we know that the use of a Van Gorp *Aggretator* has increased pumping time from 5 to 25%, depending on the deposit. We know too, that this increase in production usually pays for the cost of an *Aggretator* within a few months. It's easily installed, has a long productive life, and existing power is sufficient to drive the hydraulic pump. *Write* for details and illustrated brochure on 4 ways to increase your dredging production.

VAN gorp MFG., INC.

DEPT. PQ, PELLA, IOWA

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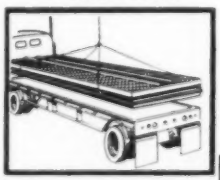
MOTOR TRUCK SCALES that SAVE You Money*

PORTABLE HEAVY-DUTY SELF-CONTAINED

Capacities to 100 TONS

- TANDEM CONNECTED UNITS
- SPLIT FRAME UNITS
- SINGLE UNITS



Write Dept. PQ for Complete Information

*These Portable Scales are designed from the ground up to give you greater operating efficiency at lower cost. Two types of decks are offered: Heavy Checkered Steel Plate Runway or timber decks. These scales are easily transported with the two steel bulkheads being held in place by two bolts, which are easily removable for transporting. Scales are of all-steel construction, eliminating problem of breakage. Simple design.

Cardinal SCALE MFG. CO.

P. O. Box 151 — Webb City, Mo.

Enter 216-C on card, page 169

Portable Lima Austin-Western 101-SE crushing plant spews pit-run stone and gravel into mobile surge bin.

Lima A-W Portable Crushers deliver

RELIABLE HIGH OUTPUT!

Designed and built for high output under *rugged* operating conditions, this portable Lima Austin-Western crushing plant is *ready* to pick up and go on a moment's notice. It belongs to the Williams Brothers Asphalt Paving Company, Ionia, Mich.

Reduced tonnage costs

They say, "It's a reliable high-output mobile rig that's been doing a very dependable job for us in widely separated locations throughout southern Michigan.

"It's not a complicated piece of equipment. Only minimum maintenance has been required. It's easy to adjust to meet a wide range of rigid specifications in pit or quarry work. We find that the outfit's one man, central control also helps us to reduce costs per ton."

The 101-SE is a completely portable, self-contained unit designed and built for rapid transport from job to job. High-speed production of construction materials near the job greatly reduces hauling time and costs.

Maintenance reduced

Diesel power operates crushers and electric generator; all other operations are electric. Simplicity of transmission eliminates troublesome clutches, chains, sprockets and gearboxes . . . reduces maintenance, increases tonnage profits.

There's a portable or stationary Lima Austin-Western crushing and screening plant just right for your needs. Investigate—see your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Stationary installation—Lima A-W line includes jaw and roll crushers, matching screens, elevators, conveyors and bins.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

6015

10 Design Refinements *Bring You Lower-Cost Crushing with* **BIRDSBORO-BUCHANAN**

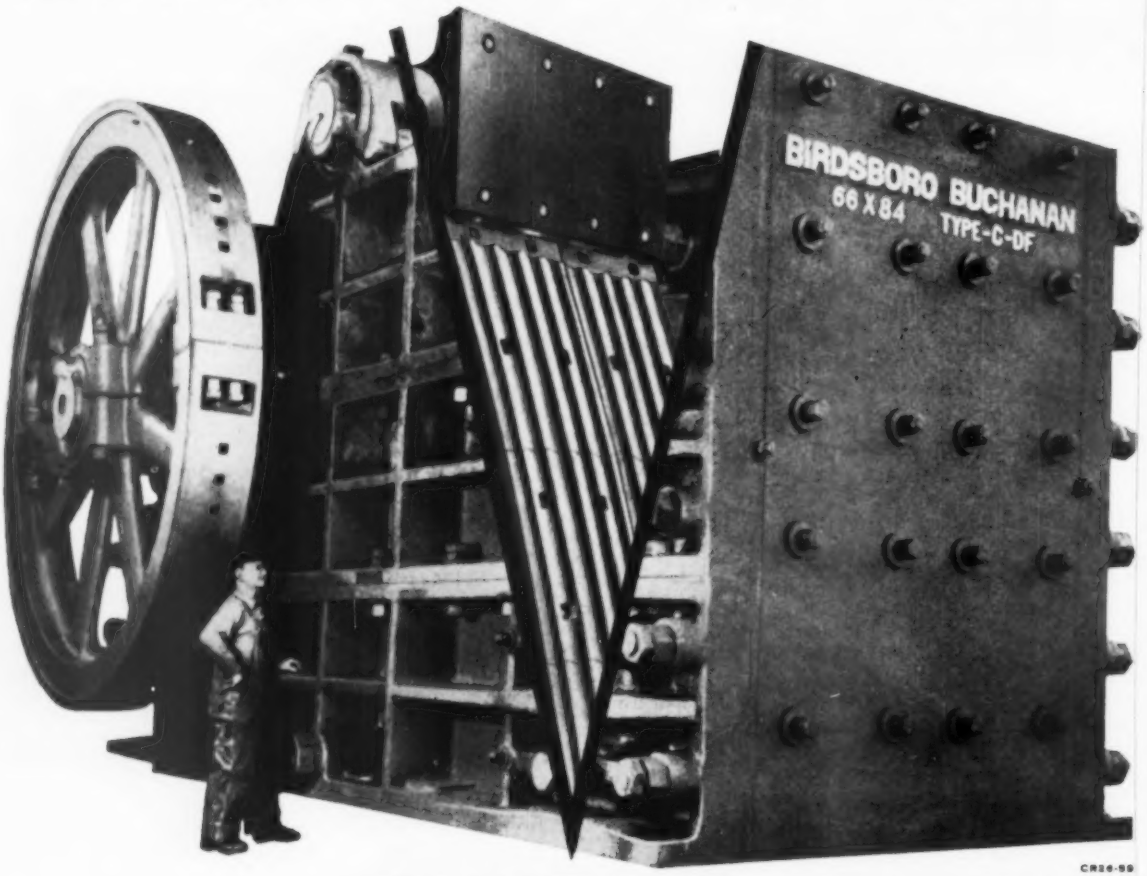
Rugged, powerful BIRDSBORO-Buchanan Deep-Frame Jaw Crushers can deliver the answer to higher costs today . . . higher production. There are ten reasons. You won't find such a cost-cutting combination anywhere but under the BIRDSBORO-Buchanan trademark.

1. **Deep, extra strong cast steel frames.**
2. **Longer, swing jaw for more acute crushing angle.**
3. **New, removable water-jacketed main frame bearings.**
4. **Rod type pitman, lighter and stronger, cuts power costs.**
5. **Automatic lubrication force feed to every bearing—no shut-down for grease jobs required.**
6. **New three-piece toggles cut replacement costs.**
7. **Extra large forged steel shafts for maximum bearing area.**
8. **Offset toe lugs allow extra wear on jaw plates.**
9. **Interchangeable and reversible jaw plates for additional wear.**
10. **Entire crusher precision constructed for easy field assembly.**

Your Birdsboro representative can translate these features into specific benefits for your operation. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

Canadian Representative & Manufacturer: John Inglis Co., Ltd., Toronto, Canada.

World-Wide Agent Representation. Contact home office for nearest representative.

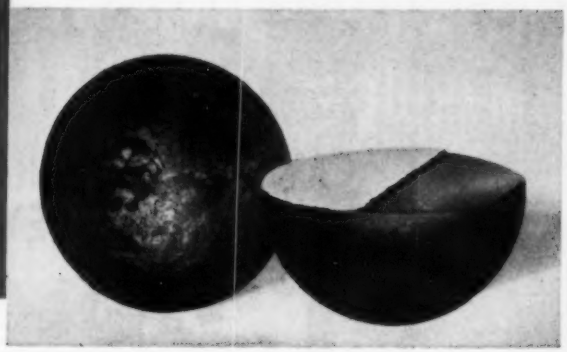


CR26-59

BIRDSBORO
CORPORATION

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel.

New steels are born at Armco



consistently

UNIFORM

fine grain structure

You can depend on it. Sheffield's alloying, forging and heat treating techniques assure a uniformly dense grain structure—a fine balance of hardness and toughness—right to the very core of every Moly-Cop Ball. That's why Moly-Cops retain their sphericity longer, to give you a better, longer grind at the lowest cost per ton.

The Standard of Comparison Around the World

SHEFFIELD
ARMCO
MOLY-COP
COPPER-MOLYBDENUM-ALLOY
Grinding Balls

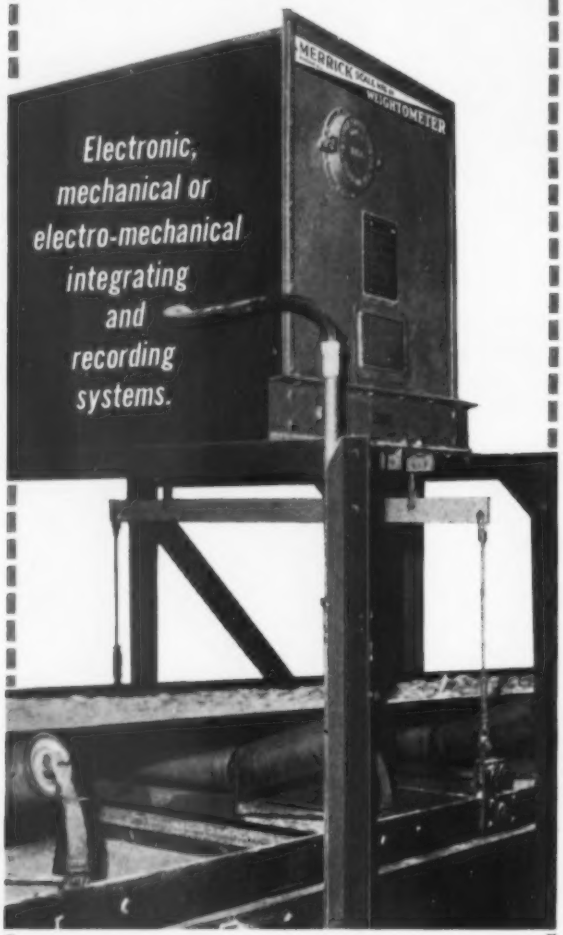
SHEFFIELD DIVISION

Sheffield Plants: Kansas City, Houston, Tulsa

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

For continuous accurate weighing of conveyor-carried materials



The Merrick®
WEIGHTOMETER

For information on how Weightometers not only weigh and record but also automate complete production systems involving bulk materials, write . . .

Merrick

more than fifty years of "firsts" in automatic weighing

MERRICK SCALE MANUFACTURING COMPANY
180 Autumn Street • Passaic, N. J.

Enter 220-A on card, page 169

NOW-A CONVEYOR IDLER PROVIDING TRUE CATENARY SUSPENSION FOR THE BELT...

S-A FLEXIROLL®

CATENARY CARRIERS FOR BELT CONVEYORS

AVAILABLE FOR 18", 20", 24", 30" & 36" WIDTHS

The STEPHENS-ADAMSON "FLEXIROLL" Catenary Carrier features a "dead-shaft" roller assembly which eliminates the problem of cable breakage common with catenary idlers but provides full flexibility for natural troughing action. The "FLEXIROLL" Carrier is immune to punishing corrosive atmosphere, extreme abrasive service and sticky or hard to handle materials — greater conveyor efficiency and less maintenance is assured.

S-A

WRITE FOR BULLETIN 260

STANDARD PRODUCTS DIVISION
STEPHENS-ADAMSON MFG. CO.
20 RIDGEWAY AVENUE • AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA
CLARKSDALE, MISSISSIPPI • BELLEVILLE, ONTARIO

Enter 220-B on card, page 169

DREDGE SLEEVE CLAMPS

Sturdy • Practical • Dependable • Economical

Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U.S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply... positive in action. Write for illustrated folder, today.

THE BLACK BROTHERS CO., INC.
9th Ave. at 4th, Mendota, Illinois

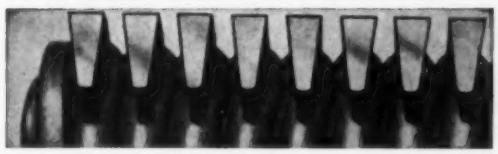
Enter 220-C on card, page 169

HOW TO SELECT DEWATERING SCREENS THAT FIT YOUR REQUIREMENTS EXACTLY

How to select Perforated Plate

Let Hendrick suggest the analysis of H Quality Steel that will stand up longest under your operating conditions. Eliminate blinding with a Hendrick screen that provides full clearance. Get continued product uniformity from the accurate, uniform mesh of a Hendrick screen.

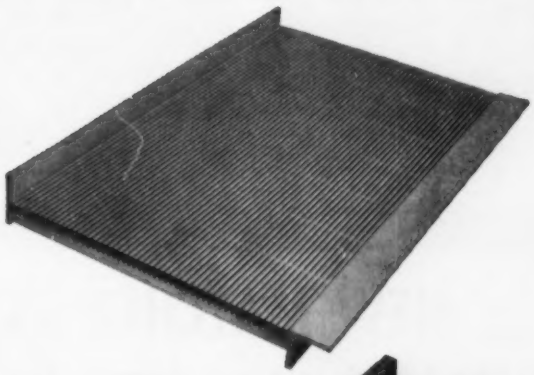
How to select Wedge Wire

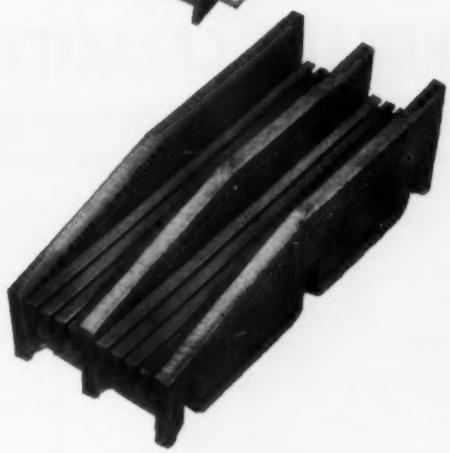


Here are three things to look for: 1) Free clearance—to reduce chances of clogging and blinding. 2) A tapered profile bar, for dewatering efficiency. 3) A deep profile bar, to assure long service life and maximum load-carrying capacity. Get all of these in Hendrick Wedge Wire. There is a type to suit your operating conditions and your needs—whether you want good screening efficiency, good dewatering efficiency, or high resistance to abrasion.

How to select Wedge Slot Screens

For more efficient processing, look for accurately spaced, uninterrupted slots. For heavy-duty service, look for thick, parallel head flanges that maintain uniformity of openings. To prevent abrasion by large chunks, specify Skid Bars. Hendrick offers all of these—*plus* 8 different profile bars. Hendrick will gladly help you select the type that will stand up best under your operating conditions.





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MANUFACTURING COMPANY

Headquarters for All Your Screening Needs

39 DUNDAFF STREET, CARBONDALE, PA.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring — Shur-Site Treads • Armorgrids • Hydro Dehazers • Distillation Column Internals

Hendrick Manufacturing Co.
39 Dundaff Street, Carbondale, Pa.

Please send me your catalog on:

- ☐ H Quality Steel Perforated Plate
- ☐ Wedge Slot Screens
- ☐ Wedge Wire

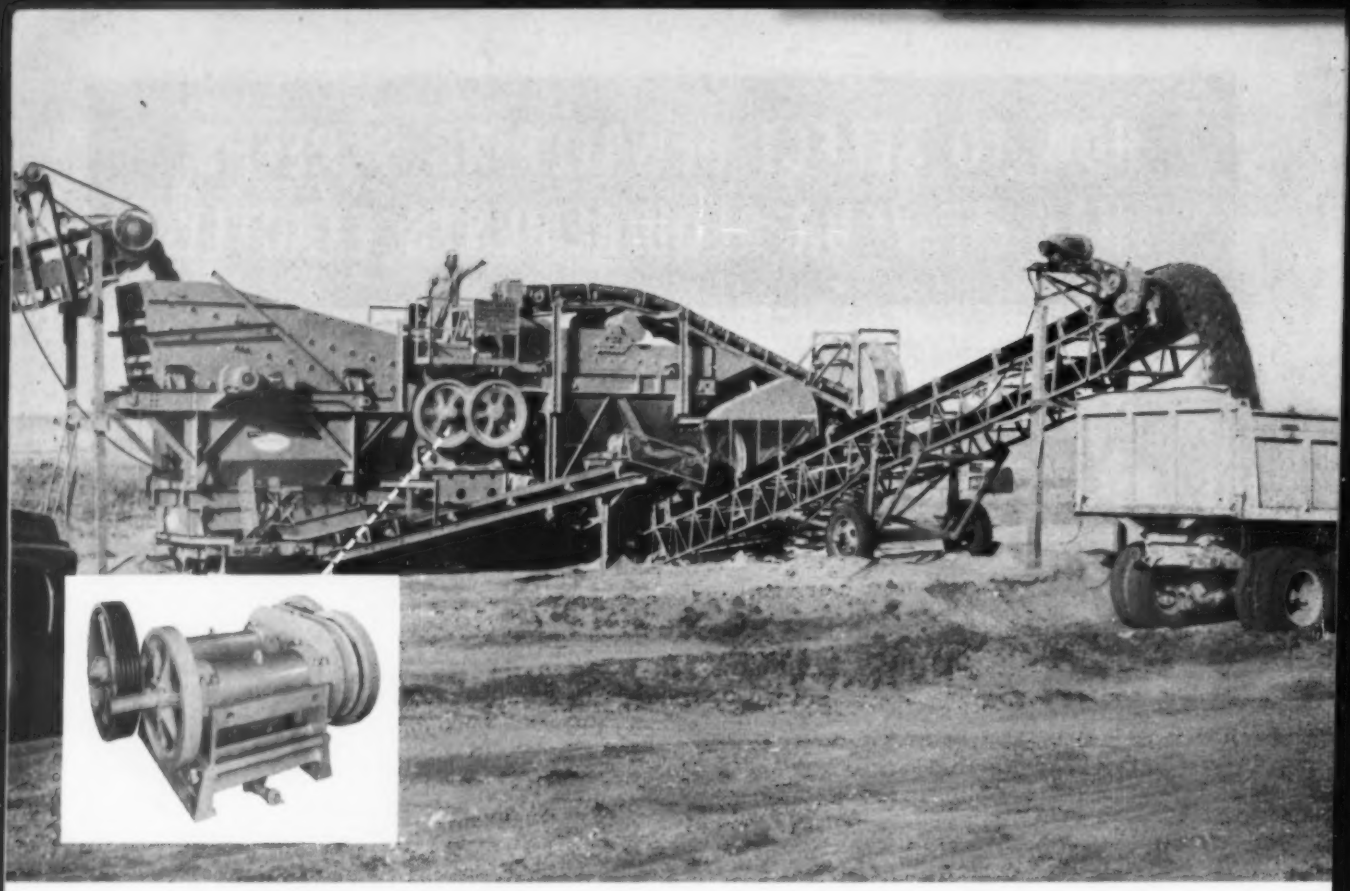
☐ I would appreciate a call from a Hendrick Sales Engineer.

Name_____

Company_____

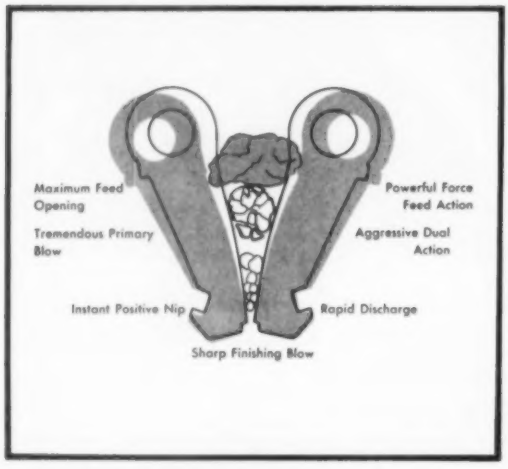
Address_____

City_____ Zone_____ State_____



NEW MATCHED JAW CRUSHER BOOSTS PRIMARY CAPACITY IN UNIVERSAL GRAVELKING

Two moving, high speed jaws feed faster, crush faster, discharge faster!



Capacities in excess of 700 T.P.H. This is the kind of production being reported on the Universal Gravelking portable plant with its new Matched Jaw Crusher.

New Matched Jaw Crusher with its longer jaws gives positive nip without belching. The high speed velocity crushing of two moving jaws provides forced feed and forced discharge. As a result you get primary crushing capacities never before thought possible.

Reduces recirculating loads. The Matched Jaws' dual crushing action with its tremendous primary blow plus sharp finishing blow assures close to finished size crushing of discharged material. This reduces recirculating loads and takes the strain off secondary equipment.

Investigate this new Matched Jaw Crusher. It could prove to be just the primary you need to boost your overall plant capacity.

Portable plants with high capacity Matched Jaw Crushers are available in the new Universal Giant and Gravelking.

Ask your Universal distributor, or write:

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

619 C Avenue N.W., Cedar Rapids, Iowa

Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois

Advertising rate per issue:

$10.50 per column inch. Lower rates for larger space used and/or on a contract basis.

Write for rate card.

Closing date:

20th of month preceding date of publication.

Used equipment, employment and professional ads only are eligible for classified advertising rates.

PIT & QUARRY
431 S. Dearborn St. Chicago 5, Ill.

BROADCAST

Section

MANAGER
FOR
AGGREGATE
(CRUSHED LIMESTONE)
PLANT

This is an outstanding opportunity with a new Eastern company that is expanding. Salary plus stock option for man who has

—a proven record of accomplishment in managing an aggregate plant.
—ability to produce profitable results through efficient operation.

We would prefer a college graduate but this is not a necessity. Age 30 to 55. This is a challenging position and a big opportunity awaits the man who can get things done and produce results.

Box No. PQ-318-C, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED
Plant Production Superintendent

Age: 28-33 years.
Education: Graduate Engineer (preferably mining, civil or mechanical).
Experience: 4 to 8 years in production, either staff or operating, but preferably operating. Must have some supervisory experience and be able to assume responsibility for costs and performance. Experience should be in industry connected with moving of heavy material either in processing or mining.
Salary: Open—commensurate with ability and experience.

Send complete resume to
Russell Lang, 2319 Cedar Crest Road
Bon Air, Virginia
(Our people know of this advertisement)

CHEMIST WANTED

Experienced Cement Plant Chemist. A growing western cement company has an opening for a plant chemist. A chemical degree and approximately five years experience in control and production of portland cement are required. Salary open.

Box No. PQ-310-B, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

CHIEF ENGINEER
FOR
CEMENT PLANT

We are looking for a man who is thoroughly familiar with most modern cement plant machinery and equipment to supervise program of expansion. This is an outstanding opportunity for a man who can take complete charge of all engineering and construction in connection with new and growing Eastern cement company.

Salary plus stock option.

College graduate preferred. Age 30-50.

Must be forceful and have proven record of accomplishment.

Box No. PQ-317-C, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

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Engineers
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J. H. ROBINSON AND ASSOCIATES LTD.
CONSULTING ENGINEERS,
SPECIALISTS IN LIME & GYPSUM DESIGN AND OPERATING PROBLEMS
53 YORK ROAD, WILLOWDALE, ONTARIO

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We do
CONTRACT DRILLING
Anywhere
SPECIALIZING IN QUARRY BLAST HOLES USING
INGERSOLL-RAND DRILLMASTERS
Hole sizes from 4¾" through 6½"
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E. E. Cooke, Proprietor
Telephone: YORK, PA. 7305 or 5881

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Quarries
Crushing Plants
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Operating Costs

E. Lee Heidenreich, Jr.
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Newburgh, N. Y.
JO 1-1828 (Code 914)

Construction
Design
Operation
Plant Layout
Appraisals

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LIQUIDATION

CRUSHING & GRINDING PLANT

MANCHESTER, CONN.

LOW PRICES FOR SALE FROM PRESENT LOCATION BEFORE REMOVAL!

2—Symons 3' shorthead cone crushers
2—Buchanan 13" x 24" Jaw Crushers, 50 HP
2—Hardinge 7' x 36" Conical Pebble Mills, Silex lining
1—Christie 4'6" x 45' Rotary Dryer
17—Abbe 6' x 8' Pebble Mills, 30 HP
1—Allis-Chalmers 6' x 18' Pebble Mill
5—Bucket Elevators, up to 40' high
1—Dings Magnetic Separator
1—Pangborn dust Collector

PHONE — WIRE — WRITE

KILNS—DRYERS

10' x 11' x 175' Vulcan Kiln, ¾" shell
8'8" x 70' Hardinge Dryers, ⅝" shell
11' x 155' Traylor Kiln, ¾" shell
10' x 78' Dryer, ¾" shell
8' x 115' United Kiln, ½" shell
7'6" x 100' Kiln, ½" shell
7'6" x 60' Dryer, ½" welded shell
7' x 50' Allis Dryer, ⅜" shell
6' x 7' x 100' Kiln, ½" shell
4'6" x 45' Christie Dryer

MILLS

BALL, Kennedy 7' x 9', 150 HP
ROD, Marcy 7' x 15', 4" Liners, 300 HP
CONICAL, Hardinge 10' x 48" ball
CONICAL, Hardinge 4' x 16" ball
CONICAL, Hardinge 7' x 36" pebble
BALL-TUBE, Allis-Ch. 6' x 16'
PEBBLE, Allis-Ch. 6' x 18'

CRUSHERS—PULVERIZERS

CONE, Symons 3' shorthead, 50 HP
GYRATORY, Allis #322, 3", 30 HP
GYRATORY, Kennedy #49S, 12", 100 HP
JAW BUCHANAN 13" x 24", 50 HP
JAW, 18" x 9", 20" x 6', 36" x 15"
ROLLER, Raymond 66", 6-roll, 200 HP
PULV., B & W Type E-32, 75 HP
SAWTOOTH, Robinson #13, 36", 15 HP

PERRY EQUIPMENT CORPORATION

1414 N. Sixth St. Phila. 22, Pa.

POplar 3-3505

POWER EQUIPMENT CO.
Offers
BARGAIN PRICES ON GUARANTEED NEW and Rebuilt MOTORS!

APRIL SPECIALS

GUARANTEED REBUILT MOTORS
220/440 V. 60 Cycle—3 Phase

HP	Make	Type	Speed
500	L.A. B.B. Splash	FX-146	3600
300	GESB Open	KT-566	720
250	El. Dyn. T.E.F.C B.B.	KNX	1800
150	Wagner B.B. Drip	RP-635	3600
150	A.C.T.E.F.C.	AZ-3-88	900
125	Reliance B.B. Open	AA-504	3600
125	F.M. B.B. Open	H	600
100	West T.E.F.C.B.B.	XPCB-770	1200

Send for our FREE Catalog. Cash for your surplus.

Large line of motors, control equipment, AC & DC Generators, MG sets and transformers.

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Phone BEverly 5-1662

WANTED

A Plant Superintendent

For Rotary Kiln Expanded Shale Aggregate Plant in Midwest—Will train properly qualified man with experience in cement or stone aggregate production.

Box No. PQ-327-D, c/o Pit & Quarry Publications
431 South Dearborn St. Chicago 5, Illinois

POSITION WANTED

Manager or Superintendent, age 45. Married. Twenty years experience as Supt. of Operations, Mine Engineer, Geologist, Master Mechanic. Rock quarry, surface and underground mining, plant design, construction and operation record, metallic or non-metallic. Available reasonable notice. U.S. only.

Box No. PQ-330-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

FOR SALE

Lorain T L 20 serial 21057 dragline priced for quick sale.

PATTERSON CONSTRUCTION CO.
NEW BOSTON, ILLINOIS PHONE JU 7-7131

POSITION WANTED
PROJECT MANAGER

15 years supervisory experience in expansion and construction of rotary kiln plants and associated installations, in direct employ of the industry. 7 yrs. additional experience in heavy industrial building with engineering and contracting firms. Can organize and perform work with plant forces, or supervise contractors. Experienced in planning and design. Available in 30 days.

Box No. PQ-335-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

OPERATIONS FOREMAN

for Block and Concrete Plant

Progressive North Florida City

Must be capable of handling full supervision of Besser or Bergen Block Plant—Concrete Plant — Material Handling—Concrete and Block Delivery Equipment. Strong knowledge of Equipment is necessary. Mechanic background is preferable. Please give full details.

Box No. PQ-326-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

FOR SALE

2 Loomis Well Drills—Electric
2 Loomis Well Drills—Gasoline
1 Armstrong Bit Sharpener, Mdl. #6
1 Telsmith Settling Tank, #5
1 Telsmith Settling Tank, #6
1 Telsmith Settling Tank, #7
1 Western Side Dump Car, 16 Yd., Std. Ga.
1 Orton Steam Crane, 25 Ton, 2½ Yd.
1 Vulcan Steam Locomotive—38 Ton
1 Vulcan Steam Locomotive—40 Ton
1 Baldwin Steam Locomotive, 50 Ton & Parts
1 Buffalo Exhaust Fan, #24
1 Buffalo Exhaust Fan, #30
1 Gates Gyratory Crusher, #7½K
1 McLanahan Crusher, 30" x 42" style C627
1 Link Belt HD Picking Table, 4' x 20'
1 Wisconsin Air Cooled Gas Engine, Mdl. VP-4
1 Flinck's Lime Spreader, 7 Ft.
1 Hoist Chain, Hand Forged, 1⅛" x 135'

NEW PARTS FOR 36" McCULLY CRUSHER

1 Main Shaft and Mantle Assembly
1 Split Adjusting Nut
1 Steel Baffle Ring
1 Cast Iron Main Shaft Sleeve

ELECTRIC MOTORS

2 5 HP, Allis-Chalmers, SR, 3/60/440/600
2 30 HP, AC, SR, TEFC, 3/60/440/1200
1 50 HP, Economy Westinghouse, 3/60/440/900
1 150 HP, AC, SC, 3/60/440/1200
1 100 HP, Burk, 3/25/440/1500
1 9 HP, G.E., Direct Current, 230V, 900 RPM

MOTOR-GENERATOR SET

1 1000 Amp, 250V, Allis-Chalmers Generator Direct Connected to 300 HP AC Synchronous Motor 3/60/440/600

THE FRANCE STONE COMPANY

1800 Toledo Trust Bldg., Toledo 4, Ohio
Cherry 1-4101

MANUFACTURING EXECUTIVE

Mature Manufacturing Executive needed by medium sized, mid-western Corporation. Ability to supervise Fabricating Shop, Machine Shop and Assembly Plant essential.

This 62 year old company manufactures portable and stationary crushing equipment for the rock and gravel industry and made-to-order heavy mining equipment.

Box No. PQ-328-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

FOR SALE

Large Commercial Sand Deposit

Location, Florida

Box No. PQ-329-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED

A man capable of taking charge of the operating end of a dirt moving, gravel and ready-mix concrete business. This is a growing concern in the Pacific Northwest which did a million dollars worth of business in 1959. Write, giving full particulars as to experience, etc.

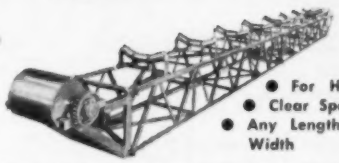
Box No. PQ-332-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

BONDED QUALITY BARGAINS

CURRENT MODELS - IMMEDIATE SHIPMENT FROM OUR FACTOY - WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES

BONDED ® TROUGHING IDLER CONVEYOR BARGAINS

8" Jr. I Beam Frame Conveyors



Truss Frame Conveyors

- Built Like A Bridge
- For High Tonnages
- Clear Spans to 50 Ft.
- Any Length - Any Belt Width

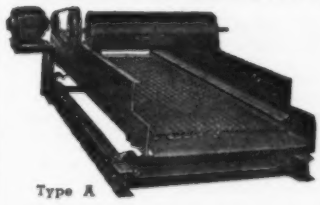
Complete Pre-Fab sections of 8" Jr. I-Beam or Truss Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% copper content. Atmospheric exposure tests disclose that they have as much as four times the resistance to corrosion as non-copper steels.

BONDED TRUSS FRAME CONVEYORS are built like a bridge and designed for long free spans to 50 feet. Constructed of structural angle and reinforced with steel plate. Both types equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2-7/16" diam. shaft. Save as much as 50% on **CONVEYOR SPECIALS** with belt in two pieces. All new, fresh stock, 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover. Made by Leading Manufacturers. **CONVEYOR PRICES INCLUDE BELTING.**

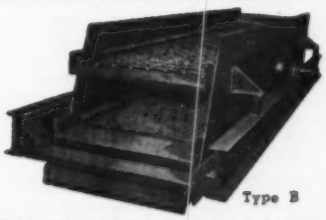
	8" JR. I BEAM FRAME CONVEYOR				TRUSS FRAME CONVEYOR		
Belt Width	Conveyor Length	List Price	Sale Price	Add or Deduct Per Foot	List Price	Sale Price	Add or Deduct Per Five Feet
14"	25'	$1425	$ 753				
14"	50'	2266	1182	$17.18			
14"	85'	3445	1783				
16"	20'	1287	680				
16"	45'	2180	1140				
16"	60'	2715	1416	18.40			
16"	90'	3786	1969				
18"	25'	1507	813		$ 2301	$1104	
18"	45'	2261	1206		3279	1573	
18"	70'	3205	1696		4491	2159	
18"	85'	3771	1991	19.62	5171	2510	117.20
18"	100'	4337	2285		5896	2862	
18"	130'	5469	2873		7273	3565	
20"	25'	1547	852		2288	1150	
20"	60'	2940	1579		3992	2017	
20"	75'	3536	1891	20.78	4799	2388	123.81
20"	90'	4133	2202		5546	2759	
24"	25'	1622	916		2389	1201	
24"	45'	2479	1361		3515	1723	
24"	70'	3550	1916		4705	2377	130.66
24"	100'	4835	2583	22.22	6257	3160	
24"	120'	5692	3026		7403	3683	
24"	150'	6977	3693		8843	4467	
30"	50'	2969	1649		3994	2018	
30"	70'	3948	2154		5162	2594	144.18
30"	90'	4928	2659	25.25	6374	3171	
36"	25'	1854	1140		3738	1866	
36"	45'	2915	1711		4059	2024	
36"	60'	3711	2138	28.51	4939	2497	157.64
36"	100'	5832	3278		7534	3758	

WRITE FOR BULLETIN #1138 — **WRITE FOR BULLETIN #1189**

BONDED ® GENERAL DUTY AND HEAVY DUTY VIBRATING SCREENS



Type A



Type B

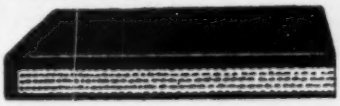
For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2' x 4' to 3' x 8'. **WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING IN BULLETIN NO. 1086."**
PRICED FROM $443

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST BUY.**
PRICED FROM $1620.

TESTED CONVEYOR BELTING*

We pay freight on 200 pounds or over plus an additional 10% savings from sale price for full rolls 500 to 650 feet.



Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.

Heavy Duty 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price Per Foot	Sale Price Per Foot
14"	4	$3.78	$2.94
16"	4	4.34	3.09
18"	4	4.69	3.42
20"	4	5.17	3.95
24"	4	6.08	4.43
30"	4	7.47	5.42
36"	4	8.85	6.43

Major Bee Brand: 16# to 19# Average Friction Pull, 2400# to 3000# Average Cover Tensile. Skim coat between plies.

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

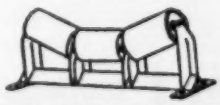
Width	Ply	List Price Per Foot	Sale Price Per Foot
14"	4	$4.48	$3.18
16"	4	5.04	3.60
18"	4	5.61	3.98
20"	4	6.14	4.54
24"	4	7.22	5.14
30"	4	8.87	6.31
36"	4	10.49	7.64
24"	5	8.47	6.01

***All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULLETIN #1263

BONDED® IDLERS & RETURN ROLLS FOR UTMOST ECONOMY ON THE JOB



3-roll, 5" diameter Troughing Idlers for:

14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:

14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213 or TEmple 7-4519**

116 BELLEVUE Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers, Feeders and Bucket Elevators **COLUMBUS 7, OHIO**

LIQUIDATION COMPLETE CEMENT PLANT, AKRON, N.Y.

Including

2—Allis Chalmers 8' x 100' Rotary Kiln.
1—Raymond 36" Bowl Mill, 50 HP.
1—Vulcan 6' x 50' Dryer, 25 HP.
1—Clyde #3 Hydrator with motor.
1—Raymond 16' Double Whizzer Separator, 75 HP.
14—Bucket Elevators, chain mounted, steel casing, 25' to 56' c.c.
1200'—9" and 14" Screw Conveyor.
15—Bins from 6' x 7', 6" x 12' to 17' x 20' x 12'.
1—Steel Building, 60' x 80' x 40' high.

OTHER LOCATIONS

1—Williams "Titan" 5 roll High Side Mill, 100 HP TEFC motor, 8' dia. Separator, complete with piping, fan, cyclone, Pangborn dust collector, & many spare parts.

ROTARY KILNS—DRYERS—COOLERS

1—Traylor 11' x 155' Rotary Kiln, 7/8" shell.
1—Allis Chalmers 9' x 130' Rotary Kiln, 3/4" shell.
1—Vulcan 8' x 87', 1/2" shell.
2—Vulcan 7' x 80', 1/2" shell.
2—Link Belt Roto Louvre Dryers, 6'4" x 24'.
1—Rennenberg 6' x 50', 3/8" shell.
1—Ruggles Cole 5' x 30', 3/8" shell.
1—Allis Chalmers 4' x 40'.
1—Allis Chalmers 4' x 30', 3/8" shell.
1—34" x 30', 5/16" shell.

MILLS—CRUSHERS—PULVERIZERS

2—Traylor Compeb Mills 7' x 27' with 1—500 HP & 1—600 HP motor 3/60/440.
1—Hardinge 4½" x 24" Steel Conical Mill.
1—Denver 3' x 5' Continuous Ball Mill.
1—Telsmith Red. Crusher no. 46, 50 HP.
2—Kennedy #6 Gyratory Crushers, 50 HP.
5—Jaw Crushers 12" x 18" to 36" x 48".
1—Penn. Non-Clog Swing Hammermill, size 5060, Hopper opening 47" x 60", cap., 200-275 tons per hour, UNUSED.
1—Penn. Super-Thor Hammermill, size SXT-13, 250 HP.

AIR SEPARATORS—SCREENS

1—18' dia. Raymond Double Whizzer Separator with 100 HP motor.
1—14' dia. Raymond Double Whizzer Separator with 60 HP motor.
1—10' dia. Raymond Single Whizzer Separator.
1—Raymond 30" dia. Whizzer Separator.
1—Tyler Hummer Screen 4' x 10'

CONVEYORS

1—Fuller-Kinyon Conveying System, type H257, 100 HP.
2—Fuller-Kinyon Conveying Systems type 10-B-No. R, 75 HP.

BRILL EQUIPMENT COMPANY

35-59 Jabez Street
Newark 5, N. J.
Tel.: Market 3-7420

Quarry For Sale

Due To Illness

Plant In Operation, Large Quantity Of Stone Shot Up.

WM. D. TIERNEY & SONS
311 Jefferson Street
Lockport, Illinois Phone TEmple 8-0531

MOTORS AND GENERATORS

All sizes, new and rebuilt. Starters, accessories, pulleys and repair parts. Gear motors. Falk Shaft mounted Speed Reducers, couplings and V-belt drives.

EXPERT REPAIR SERVICE

NUSSBAUM ELECTRIC CO.

220 E. Douglas Avenue Fort Wayne, Ind.

TANDEM TRUCKS

In good condition and appearance, 2—1954 Hendricksons; 4 1957 Whites; 32M rear boggies; 10:00x20 nylon tires; 8 speed transmissions. Photos on request.

CHARLES DUNCAN
Piedmont, Missouri

FOR SALE

32 x 40 Austin Western Roller Bearing Jaw Crusher with or without "V" drive and 175 HP electric Motor

MANWARING MACHINERY CO., INC.
1202 W. 27th St., Indianapolis 23, Indiana
Phone: WAlnut 3-4535

SAND BUSINESS FOR SALE ON LAKE ERIE

Consists of equipment on leased docks and one owned parcel, also two self-propelled dredges.

Owner will accept written proposals on this property as a complete unit or piece meal by locations reserving the right to accept or reject such proposal.

For further information call

E. J. Berry

Erie Sand & Gravel Co.
GL 2-6931 or Box 153 Erie, Pa.

FOR SALE

1 Vogt 300 H.P. Water Tube Boiler complete with coal handling equipment. Perfect spreader type stokers. This boiler in good condition and less than 10 years old.
2 Norblo dust collecting square type air filter systems Model 230, complete with St. Regis automatic bagger and Howe scales #82 with exact weight indicator #4110.
1 Rogers Jaw Crusher—Size 15 x 24
1 Deister Plat-O Vibrating screen—Type 1-2½-4.
1 Under the track conveyor unloader. Will handle stone, coal or coke.

MIDWEST INSULATIONS, INC.
P.O. Box 336 Phone 1234
Wabash, Indiana

FOR SALE LOCOMOTIVES

2—45 ton G.E. Diesel Electric with Cummins Engines
1—65 ton Porter Diesel Electric with Cummins Engines
1—30 ton Plymouth diesel mechanical with GMC Engine.

Excellent Condition

Phone—Wire—Write

HYMAN-MICHAELS COMPANY
108 N. State Street Chicago 2, Ill.
'Phone: DEarborn 2-5422

YOU CAN SAVE MONEY AND MAKE A PROFIT ON THIS EQUIPMENT:

QUARRY EQUIPMENT

Cedarapids Jr. tandem crushing plant, 1036 jaw.
Cedarapids 6C, portable secondary plant.
Cedarapids 1216 twin jaw crusher.
Cedarapids 1036 jaw crusher. Reconditioned.
Universal 2436 jaw crusher. Reconditioned.
Austin-Western 1536 jaw crusher
2—Cedarapids 4033 hammermills. Rebuilt.
Cedarapids 2033 hammermill. Slightly used.
Cedarapids 4' x 14' 2-deck screen. New warranty.
2—Cedarapids 4'x12' 2-deck screens. Rebuilt.
Robins 4' x 9' triple deck screen.
Pioneer 4' x 8' double deck screen. Rebuilt.
Telsmith 3' x 8' 3-deck inclined screen.
Aggregates 4' x 14', 3-deck inclined screen.
54" dia. x 23' lg. revolving screen.
4' x 6'6" heavy duty reciprocating feeder.
2—Cedarapids 42"x10' apron feeders.
Cedarapids 30-S, 3-compartment charging hopper, apron feeder, bucket elevator. New.
Eagle 36"x20' double dog washer. Good.
McLanahan & Stone 8'x30' double log washer.
Smitheo 10-yd. portable charging bin.
8'x12', 8'x18', 13'x23' bins in stock.
18", 24", 30", 36" conveyors & belting.

SHOVELS AND CRANES

Lorain L-28, ¾-yd. diesel dragline. Excellent.
Lima 84 Paymaster ¾-yd. diesel shovel. Good.
Unit 1020 ¾-yd. diesel powered shovel.
Koehring 304, ¾ yd. diesel shovel-backhoe.
Insley K-12, ½-yd. gas backhoe
Bucyrus-Erie 10B, ⅝-yd. gas shovel.
Byers 83-CC, 20-ton truck crane
Lorain MC-414, 20-ton Moto-Crane. Reconditioned.
Link Belt HC-90, 25-ton truck crane.
Michigan TLDT-20, 10-ton truck crane.
Lorain MC-254W, 17½-ton moto-crane.
Lorain MC-254, 15-ton moto-crane.
Lorain TL-20, 10-ton moto-crane.

TRUCKS, TRACTORS, SCRAPERS

2—Euclid 13-yd. bottom dumps. Good.
2—Euclid 27FD, 15-ton rear dumps.
1—Euclid tractor with 3200 gallon water tank
1—Caterpillar D-8 with cable angle dozer.
1—Caterpillar D-8 with Heil scraper.
1—Caterpillar D-7 with hydraulic angledozer.
1—Caterpillar D-4 tractor only.
1—Euclid TC-12, twin engine tractor
1—International TD-24 with cable angledozer.
1—Letourneau Super C Tournadozer. Excellent.
1—Allis-Chalmers HD9-G tractor with loader
1—Allis Chalmers TS-360, 15-yd. scrapers.
2—Euclid TS-24, 24-yd. twin engine scrapers.
2—Euclid TS-18, 18-yd. twin engine scrapers
3—Euclid 18-yd. overhung engine scrapers.
1—Euclid 15½-yd. six wheel scraper.
3—Euclid 7-yd. overhung engine scrapers
Inquire for list of Drilling Equipment, Air Compressors, Diesel Power Units, Generators, Shovel & Backhoe Attachments.

L. B. SMITH, INC.

Camp Hill, Pa.

Phone Harrisburg REgent 7-3431

WANTED

New or used in good condition. 200 Ft. 24" 4 Ply 28 oz. Duck Conveyor Belt for Sand and Gravel Plant.

THE ELM CITY CONSTRUCTION CO.
P. O. Box 4187, Hamden 14, Connecticut

READY MIX PLANT FOR SALE

1959 Model Erie, fully automatic, capacity over 150 cu. yds. per hour. 120 ton, four compartment aggregate bin; one cement bin with two fill valves for easy conversion to two bins; completely unitized center section pre-wired and pre-piped with 10 HP air compressor and all scales and electrical gear mounted; 6 cu. yd. aggregate batcher, 42 cu. ft. cement batcher and 300 gallon water batcher; all with jogging automatic cutoff; 50 ton per hour cement elevator with under-track feed screw; 600 bbl. cement silo; 30" x 174' Barber Greene aggregate conveyor with 20 ton feed hopper; located near Topeka, Kansas. This plant has been used on only one job and is in excellent condition. Will sell for 80% of purchase price or about $45,000. Also, have several 1955 Smith 6 yd. mixers on trucks for sale. Call or write Mr. R. C. Brown

CONCRETE MATERIALS, INC.
727 Kansas Avenue, Kansas City, Kansas
Finley 2-7676

A VERY LARGE AUCTION

MON. MAY 2nd, TUES. MAY 3rd

BUTTE, MONTANA

Kiely Construction Co., Mr. Bill Kiely, is quitting the contracting business and selling his equipment, large and small, sale will be held on his lot.

EACH PIECE POSITIVELY SELLS REGARDLESS OF PRICE — NO BID INS — NO BUY BACKS!

TRACTORS - MOTOR SCRAPERS - MOTOR GRADERS - SCRAPERS

Two Cat D-9's, 18A's w/Cat 9S dozers and Cat hyd rear rippers. Cat D-8, 36A—Less than yr old, w/8A dozer & #30 CCU. 4 Cat D-8's, 14A's, w/8A and 8U dozers & CCU's; 2 Later 2U Cat D-8's w/8U & 8A dozers; Cat D6, 9U, w/8A dozer. 2 AC HD-21's, one w/dozer. 3 Cat DW-21 Motor Scrapers, 69C's w/470 Scrapers—good. 2 Cat DW-20's w/Cat 20 Scrapers, modified & good. 3 Cat 90 and one Cat 80 Pull Scrapers. 4 Cat #12 Motor Graders, 8T's, 3/oil clutchers, scarifiers, hyd steer.

FRONT END LOADERS - LOWBOYS - DUMP TRUCKS - TRUCKS

Michigan 375A Loader, 6 yard, NOT USED FULL SEASON. Michigan 175 AD Diesel front Loader. Cat #6 Shovel. Two Peerless 40 ton Lowboys, tandem—like new. 2 Mack '56 tandem B60, Mack B42 '55 tandem and '54 Ford F800 dump trucks. Kenworth tandem Cummins Diesel '50 dump truck. Mack tandem Cummins diesel '54 truck-tractor w/winch—very good. IHC 4064 Westcoaster, 1947, truck-tractor Cummins diesel w/winch. GMC Diesel 970 tandem 4,150 water truck. Complete Lubrovan lube unit on '56 GMC Truck. 7 Ford & Chev pickups. Other trucks & trailers. Two 1,000 gallon distributors. Water trucks and trailers.

SHOVEL - BACKHOE - TRUCK-CRANE - ROLLERS - END & REAR DUMPS - ELEC. SETS

Koehring 304 w/shovel front. Koehring dragline on Murty tandem diesel carrier, 304. Two 304 backhoe attachments. Buckets. Seman Andwall 5620 s-p compactor, 2 Essick vib rollers, pneu rollers; LeT & Ferg triple drum sheepfoots; Cat #28 ripper; 3 Euclid 27FD End Dumps. 5 Euclid 9FTD Bottom Dumps. 4 Peerless 20 yard bottom dump trailers, used 800 hrs. Cat D13000 and Cat D8800 elec sets. Other items.

CRUSHING EQUIPMENT

Cedar Rapids Primary Portable Crusher, 30x40, heavy duty—used less than one year. Cedar Rapids Secondary Roll Crusher, 40x24 roller bearing crusher, 48" x 12' dd vib screen—Portable. GMC 671 twin power unit. Symons Cone Crusher 4' cone, dd 4x12 vib screen. GMC 6-110 power, portable, used less than year. Cedar Rapids twin jaw crusher, 18x36 roller bearing twin jaw crusher, 48"x10' dd scalp screen ME-66 power, Portable. Pioneer 46VE Portable crusher, 1036 jaw 4011 roll, 48"x12' 3½ deck vib screen. Cat D-13000 Elec set. Murphy ME-650 Power unit—all portable. G-D Air-Trac drill, like new. Hewett-Robbins Portable 14x15 triple deck screen, used less than year. Portable crusher trap w/36"x30' conveyor. Kolman Portable loader w/50'x42" conveyor. 10 Portable conveyors from 36"x60' to 24"x50'. Pioneer 24"x6' apron feeder. Challenger twin Rotary drill w/IR Gyro 600 cfm comp on HD-19 tractor. Murphy 60 ton portable scale. Other crusher equip.

ASPHALT PLANTS AND ASPHALT EQUIPMENT

Madsen Portable 4,000 lb Model 481 Asphalt plant all complete including elec sets, power units, etc. Two 17,500, 8,000 & 4,400 gal asph storage tanks, insulated and coiled-portable. Cedar Rapids 2500 lb Model FA Portable Asphalt plant, all complete w/elec sets and power. Two 8,000, 6,000 and 3,400 gal asph storage insulated, coiled and portable tanks. BOTH OF THESE PLANTS VERY GOOD. C-B Model 1A-BBC Tank car heater and booster, portable. Blaw-Knox PF-90 asph paver. B-G 879A asph paver. Flaherty S-P spreader. Buffalo-Springfield, Triple axle tandem roller, and two 8-10 ton tandem rollers. Other asphalt equipment.

MISCELLANEOUS EQUIPMENT

3 G-D compressors, 600, 500, 105 cfm. Air tools. Parsons 310 & B-g 44C Ditchers. Welders. Steam generator. Stationary cement plant. Concrete equipment. Wheel Tractors. Quantities of small items, shop tools. Quantities of AC, Cat, NW and various new and used parts.

All equipment owned by Kiely Construction Co., **WRITE-WIRE** Auction firm for complete comprehensive sale bill. Remember **EACH PIECE POSITIVELY SELLS REGARDLESS OF PRICE. FINANCING AVAILABLE** on items over $2,000, no prequalification necessary.

FORKE BROTHERS
the Auctioneers
321 Sharp Bldg. **Lincoln, Nebraska** HEmlock 2-1045
— EQUIPMENT AUCTION LEADERSHIP SINCE 1921 —

KIELY CONSTRUCTION CO.,
Owner
Butte, Montana

ELECTRIC AIR COMPRESSORS
2—Ingersoll-Rand, 3000′, 2200′ & 1300′

DIESEL LOCO CRANE
25-ton Industrial Brownhoist with D13000 Cat. diesel & 60 ft. boom

DIESEL LOCOMOTIVES
7—25 ton, 4—45 ton, 1—65 ton, 1—80 ton, 2—100 ton General Electric
9—8, 12, 15 & 30-ton Plymouth

DUMP CARS
300—1½, 3, 5, 16 & 20 yds. cap.

20-TON STIFF LEG DERRICK
96′ boom, 40′ mast, 50′ S. legs, 39′10″ sills, 16′ bull wheel

BALL MILLS
4′ x 5′ Miners Foundry
2—5′ x 8′ Kennedy Van Saun Air Swept Tube Mills
7′ x 15′ Marcy Grate Discharge 300 HP motor

HARDINGE CONICAL BALL MILLS
4′6″ x 16″ 6′ x 36″, 8′ x 36″, and 10′ x 48″

ROD MILLS
6′ x 12′ Marcy Center Peripheral Discharge
7′ x 15′ Marcy Open End 300 HP motor

TUBE MILLS
6′ x 15′ Allis Chalmers Grate Discharge
7′ x 18′ Patterson with motor & reducer
7′ x 24′ Bethlehem and Foundry

HAMMERMILLS
42″ x 36″ Jeffrey Type B-2, with many spares
2—HMH-04-NC Hammermills, traveling breaker plate
3X8 Gruendler 30″ x 48″
8XT-14 Pennsylvania 400 TPH

JAW CRUSHERS
10″ x 16″ Pioneer, bronze bearings NEW
14″ x 28″ New England Road Machinery
22″ x 36″ Cedar Rapids Roller bearing
24″ x 36″ Pioneer with 150 HP motor
30″ x 36″ Traylor Type ″H″
36″ x 42″ Farrell Bacon (in Canada)
48″ x 72″ Buchanan Type ″C″
56″ x 72″ Traylor (4 piece frame)

ROLL CRUSHERS
24″ x 16″ Cedar Rapids Double Roll
30″ x 18″ Cedar Rapids Double Roll
18″ x 18″ McLanahan & Stone Double Roll
42″ x 16″ Allis Chalmers Double Roll

CONE AND FINE REDUCTION
No. 1 Sturtevant
No. 19 Kennedy Van Saun
No. 122 Allis Chalmers Hydrocone
No. 28 Telsmith Intercone
2′ Symons Standard Cone
No. 37½ Kennedy Van Saun

GYRATORY CRUSHERS, PRIMARY
12″ Kennedy Van Saun
16″ Allis Chalmers Superior McCully
20″ Allis Chalmers Superior McCully (2) new 1948
25B Telsmith Primary Breaker
No. 11 McCully

PORTABLE CRUSHING AND SCREENING PLANTS
No. 2A Cedar Rapids Secondary, 24″ x 16″ Rolls, 3′ x 8′ 1½ deck screen, 40TPH
No. 61E Austin Western, 10″ x 24″ Jaw, 3′ x 10′ Screen, and electric motors
101 Austin Western 10″ x 36″ Jaw, 30″ x 18″ Rolls, 3 deck screen, and Murphy Diesel Engine

CONVEYOR
24″ x 95′ H.R. 42″ Truss. NEW.

VIBRATING SCREENS
4′ x 8′ & 5′ x 10′ Symons Rod Deck
4′ x 10′ Hewitt Robins Double Deck
5′ x 12′ Hewitt Robins Double Deck

CLASSIFYING AND WASHING EQUIPMENT
7′ x 30′ Eagle Twin Log Washer
84″ x 12′ Telsmith Super Scrubber
12′0″ Link Belt Dewatering Rotoscope UNUSED
8′ x 48″ Hardinge Conical Scrubber
Size 10 Sand Settling Tanks (2)
20″ x 15′ Telsmith Twin Screw Sand Classifier
60″ x 35′ Telsmith Sand Drags (2)
10′ x 20′ Eagle Water Sculping Tank

ROTARY DRYERS
5′ x 30′ Ruggles Cole Model XA-8
5′6″ x 60′ Dryer or Cooler
8′ x 60′ reconditioned, ½ welded shell
3—10′ x 78′—⅜″ shell

ROTARY KILNS
9′ x 160′ Allis Chalmers with burner
6′ x 72′ ⅝″ Shell, gear train drive

R. C. STANHOPE, INC.
60 E. 42nd St. New York 17, N. Y.
Tel.: MU. 2-3075 or MU. 2-1898

FOR SALE

SHOVELS

P&H 1400 DE—5 Yd. Diesel Electric
MARION 490E—2½ Yd. Electric
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Model & Serial No.	Capacity	Location	Year Built
Euclid 40 TD 11558	22½ tons	Indianapolis, Ind.	1951
Euclid 49 FD 8129	15 tons	Hazleton, Pa.	1947
Euclid 49 FD 6395	15 tons	Hazleton, Pa.	1947
Euclid 49 FD 8984	Water Wagon	Indianapolis, Ind.	1947
Euclid 49 FD 7761	15 tons	Indianapolis, Ind.	1948
Euclid 49 FD 8179	15 tons	Indianapolis, Ind.	1948
Euclid 49 FD 6753	15 tons	Indianapolis, Ind.	1947
Euclid 49 FD 7471	15 tons	Indianapolis, Ind.	1948
Euclid 49 FD 10108	15 tons	Indianapolis, Ind.	1951
Euclid 20 TD 10583	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10591	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10830	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10837	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10581	22½ tons	Boise, Idaho	1950
Euclid 32 TD 11475	22½ tons	Boise, Idaho	1951
Euclid 20 TD 10582	22½ tons	Coeur d'Alene, Idaho	1950
Euclid 20 TD 10836	22½ tons	Coeur d'Alene, Idaho	1950
Euclid 20 TD 10588	22½ tons	Coeur d'Alene, Idaho	1950
Euclid 20 TD 10835	22½ tons	Coeur d'Alene, Idaho	1950
Euclid 20 TD 10589	22½ tons	Birmingham, Alabama	1950
Euclid 20 TD 10828	22½ tons	Birmingham, Alabama	1950
Euclid 20 TD 10831	22½ tons	Birmingham, Alabama	1950
Dart 10SUG57037	10-ton Underground	Worcester, Mass.	1957
Dart 10SUG57038	10-ton Underground	Worcester, Mass.	1957
Dart 10SUG57051	10-ton Underground	Worcester, Mass.	1957
Dart 10SUG57052	10-ton Underground	Worcester, Mass.	1957
Mack LRIS 1099D	15 ton	Providence, R. I.	1950
Mack LRIS 1159D	15 ton	Providence, R. I.	1950
Mack LRIS 1185D	15 ton	Providence, R. I.	1951
Mack LRIS 1186D	15 ton	Providence, R. I.	1951
Mack LRIS 1053D	15 ton	Indianapolis, Ind.	1949
Mack LRV2D 1242D	34 ton	Hibbing, Minn.	1952
Mack LRV2D 1243D	34 ton	Hibbing, Minn.	1952
Mack LRV2D 1244D	34 ton	Hibbing, Minn.	1952
Mack LRV2D 1245D	34 ton	Hibbing, Minn.	1952
Mack LRV2D 1247D	34 ton	Hibbing, Minn.	1952
Mack LRV2D 1248D	34 ton	Hibbing, Minn.	1952
Mack LRV2D 1287D	34 ton	Hibbing, Minn.	1953
Mack LRV2D 1289D	34 ton	Hibbing, Minn.	1953
Mack LRV2D 1291D	34 ton	Hibbing, Minn.	1953
Mack LRV2D 1297D	34 ton	Hibbing, Minn.	1953
Mack LRV2D 1300D	34 ton	Hibbing, Minn.	1953
Mack LRV2D 1302D	34 ton	Hibbing, Minn.	1953
36 TD 13186	22½ tons	Kemmerer, Wy.	1953
36 TD 13165	22½ tons	Kemmerer, Wy.	1953
36 TD 13032	22½ tons	Kemmerer, Wy.	1953
36 TD 13033	22½ tons	Kemmerer, Wy.	1953

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15-22½-35 Ton

FOR SALE

36TD Euclid rear Dumps—22½ ton.
36TDA Euclid rear Dumps—22½ ton.
20TD Euclid rear Dumps—22½ ton.
49FD Euclid rear Dumps—15 ton.
27FD Euclid rear Dumps—15 ton.
2FFD Euclid rear Dumps—35 ton.
9W Bucyrus Erie Dragline, 9 yd., 200'.
7400 Marion Dragline, 12 yd., 175'.
151-M Marion Shovel, 5 yd.
2400 Lima Dragline, 6 yd.
4500 Manitowoc Dragline, 5 yd.
120-B Bucyrus Erie Shovel, 5 yd.
4161 Marion Shovel & Drag, 5 yd.
3500 Manitowoc Dragline, 2½ yd.
1201 Lima Dragline, 3 yd.
95 Northwest Dragline, 2½ yd.
54-B Bucyrus Erie Dragline, 2½ yd.
54-B Bucyrus Erie Shovel, 2½ yd.
80-D Northwest Shovel, 2½ yd.
170-B Bucyrus Erie Shovel, 6 yd.
955 P&H Dragline, 2½ yd.
1055 P&H Dragline, 2½ yd.
1055 P&H Dragline, 3½ yd.
Model 6 Northwest Shovel, 1½ yd.
93-M Marion Shovel, 2½ yd.
4500 Manitowoc Shovel & Drag, 5 yd.
111-M Marion Hi-lift Shovel, 4 yd.
625 Page Dragline, 9 yd.
621-S Page Dragline, 6 yd.
3900 Manitowoc Cranes.
25 Northwest Truck Crane. New.
D-8 Cat. Dozer 2U Series. $10,000.
D-9 Cat. Dozer 18A. Rebuilt.
Shovel Attach. for 38-B Bucyrus Erie.

FRANK FAMALETTE EQUIPMENT COMPANY

P. O. Box 325 Hazleton, Penna.
GL 5-4708 - GL 5-4196

WANTED

32x40 **JAW CRUSHER PORTABLE** or **Larger.** Also consider hammermill secondary.

Leavenworth Quarries, Kansas City, Kansas
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FOR SALE

One 2236 Cedar Rapids Jaw Crusher, Serial No. 14304. One 12 ft. Cedar Rapids Apron Type Feeder recently overhauled. This equipment is in good condition and ready to operate. Phone Victor 3-3983.

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P.O. Box 806 Barren River Road
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Broadcast Section

"The Marketplace of the Industry"

ELECTRICAL POWER EQUIPMENT

REBUILT SLIP RING MOTORS
3 ph 60 cy 220 or 440 volts

HP	RPM	MAKE	TYPE
1500	514*	Al.-Ch.	Mill Type
1300	360*	Al.-Ch.	Mill Type
900	160*	Al.-Ch.	Mill Type
600	1800*	Gen. Elec.	M-6345S, Dppf. New
500	1200	Gen. Elec.	M-6345Z, Dppf.
400	720	Gen. Elec.	MT-57 3Y
350	900*	West.	CW
350	1800*	Al.-Ch.	ARYW (2)
300	1800	Cr.-Wh.	SR
300	600	Gen. Elec.	I-M-17A
300	600*	F.-Morse	HV-H300D, BB
300	450	Gen. Elec.	I-M, 2 or 3 brg.
250	720*	Gen. Elec.	I-M, 17A

*2200 volts or higher.

SQUIRREL CAGE MOTORS
3 ph, 60 cy, 220 or 440 volts (*2200 volts or higher)

HP	RPM	MAKE	TYPE
1250	3600*	Al.-Ch.	ANX
800	1800	West.	CS-34C
600	600*	West.	CS-44-C15 Dppf. (2)
500	1200	Gen. Elec.	I.K.
400	1800*	L. Allis.	BB, Sppf.
400	1800	West.	BB, Dppf.
400	1200	Gen. Elec.	K TP-565
350	3600	Cr.-Wh.	SC, Dppf.
300	1200	Gen. Elec.	KT-559, Dppf.
300	600*	West.	CS-39A
300	600*	West.	CS-1002
300	400	Elliott	Design 40Y03
250	1800	Gen. Elec.	KT-559
250	1800	West.	CS-8120S, TEFC, Xpf.

SYNCHRONOUS
3 ph 60 cy A.C.

HP	RPM	MAKE	REMARKS	VOLTS
900	1200	Gen. Elec.	TS, 1.0 PF	2300
300	357	Ideal	SMM, .8 PF	4000/2300
275	450	Gen. Elec.	ATI, 1.0 PF	2300
250	1200	Al.-Ch.	1.0 PF	440(4)
225	300	Gen. Elec.	TS-6244D, 1.0 PF	220
225	360	Elec. Machy.	1.0 PF	440
225	720	Al.-Ch.	6 PF	2200/410
210	1200	Gen. Elec.	ATB-32, bus. exc.	400
200	1800	Gen. Elec.	TS-7559, dir. con. exc.	440
190	720	Elec. Machy.	1.0 PF	440
150	300	West.	HR, 1.0 PF	2200
150	1200	Al.-Ch.	1.0 PF	440
150	1200	Elec. Machy.	.8 PF	2200/440
125	277	Gen. Elec.	TS-6214, 1.0 PF	2300(3)

M. G. SETS

KW	Make	Motor A.C.V.	Generator D.C.V.
1000	West.	4160	250
600	G.E. (3 unit)	2300/440 syn.	125/250
500	West.	2300/440 syn.	125/250
400	Al.-Ch.	2300/440 syn.	125/250
300	West.	2300/480 syn.	250
200	Reliance	2300/440 syn. TS	500
200	Gen. Elec.	2300/440 syn. TS	250/275
200	Ridgeway	2300 syn.	250
150	Al.-Ch.	220/440/220	250
150	West.	2300/440/220 syn.	125/250
125	West.	2400/480 syn.	250
125	G.E.	2400/480 syn.	250
100	West.	2300/4000 syn.	250/275
100	G.E.	2300/4160 syn.	250

D. C. MOTORS
37½/75 575/1150 Reliance CD-1342Y(450V.) 230 Volts

HP	RPM	MAKE	TYPE
300	575/1150	West.	CB-509-4
200	700	West.	SK-201
175	700	G.E.	FLC-11
150	380/1000	G.E.	MCF
150	1150	G.E.	RC-37 (4)
150	720	G.E.	RC-39A
150	400	West.	SK-201
125	870	G.E.	CD-1343,dppf.
100	2500	G.E.	RC-34
100	400/800	G.E.	MPC-6
100	575/1150	G.E.	CD-147
100	1150	West.	SK-163
100	750	G.E.	CD-135
100	575	G.E.	CD-147

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3—1250 KVA Allis Chalmers Class OA Oil filled 3ϕ ph 60 cy 34,400 Volt primary, 480 volt secondary with taps, manufactured 1955.

Write for current complete stock lists on Motors, Transformers, Generators or other electrical power equipment you need or send your list of surplus and used equipment for our offer.

Phone CAnal 6-2900

CHICAGO Electric Co.

1329 W. CERMAK ROAD • CHICAGO 8, ILL.

OUR 52nd YEAR

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Belt Conveyors All Sizes Built to Order.
Largest Stock Reducers on East Coast.
Motors Up to 50 H.P.
Good Used Belt 18" to 48".
16" Used Rex Idlers.
18" Used Barber-Greene Idlers.
24" Used Jeffrey Idlers.
30" to 48" Used Robins Idlers.
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Niagara 2½' x12' Single Deck Screen.
Niagara 4' x 14' Single Deck Screen.
Jeffrey Traylor #4 Vib. Feeder w/contr.
Syntron F-4100 Feeder with controls.
New Holland Plate Feeder 24" x 60".
Sturtevant #1 Rotary Crusher.
New England Jaw Crusher 14" x 28".
Farrel Lab. Jaw Crusher 6" x 2".
Acme Jaw Crusher 14 x 26" Steel Frame.
Iowa 25 Yd. Portable Crushing Plant.
2—Lancaster "Iroquois" Pug Mills.
Heatherington Dryer, 6' x 32', 50 H.P.

G. A. UNVERZAGT & SONS INC.
136 Coit St.
Irvington, New Jersey
Essex 3-8105

SPECIALS: Heavy Media #2M MILL, drum Separator, Classifier, AC 4x16 Lowhead Screen, Dings Magnetic Separator complete. 196' span Steel Bridge Truss. 46'x24' Steel Bridge.
PLANTS: CR Commander 1036, 1524, 1824, 2236 port. Noble CA354 & CA506 Batch. Cummer 3000# & 4000#, HG842 Asphalt.
CRUSHERS: 816, 1020, 1036, 1536, 1836, 2036, 2436, 3042, 3642 JAW. 9K & 12K Gates. AC322R, 636, 848R. 16" Traylor. 25½ & 37½ KVS. 28", 25B Telsmith GYR. 3' Symons. 1836, 1842 sgl., 3018, 4024, 5424 dbl. ROLL.
DRYERS: 2x12, 3x15, 4x20, 4x30, 5x24, 6x25.
COMPRESSORS: 750 CFM West. 600 CFM IR.
FEEDERS: 3x8, 3x10, 42"x12, 3x14 Apron.
3—10" McL. 1—Eagle 36"x20', dbl. Log Washers.
MILLS: Raymond 5047, 5057 Roll. Dixie 2424, 3630, 3650, Gruendler 4230, Wms. 4&5 Hammer.
CONVEYORS: 18"x30', 18"x178', 24"x115', 36"x250'.
SHOVELS: Marion 93M, 111M, NW6, 80D. Link Belt LS90, LS50, B5. Lima 34, 604, 1201. P&H 655B & 1055. Koehring 605 & 1005. Lorain 90.

MID-CONTINENT EQUIPMENT CO., INC.
8321 Gannon Wydown 1-2826 St. Louis 24, Mo.

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Like New—Save 50%
DITCHER—MODEL 44C

Barber-Greene Vertical Boom 18 ft. Cutting 24" Weight 11 ton Located in our yard

ATTACHMENTS
PULL SHOVEL — ¾ YD.
POWER SHOVEL — ¾ YD.
FAIR LEADS — TAGLINE
BOOM SECTIONS — JIBS
NORTHWEST — MODEL 25
MANITOWOC — MODEL 2000
UNIT — MODEL 614

TRUCK CRANES
BOOM SEC. JIBS
BROWNING MODEL T20
BAY CITY MODEL 190
NORTHWEST MODEL 25
LORAIN MODEL M.C. 524

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3—10' x 78' Dryers with 200 HP Motors
4¼' Symons Std. Coarse Bowl
2—5½' Symons Std. Med. Bowl
30" Merrick Weightometer

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Lima Model 1201, 3½ yd., S/N 5257, in good condition.
Includes:
High-lift shovel on 42' boom, 32' handle in excellent condition—may be bought separately.
Cummins—Model L Diesel in excellent condition, S/N 71086. Walk-around platform. Air Controls. 85' boom in new condition. Immediate delivery.
Financing if desired on entire rig; or on crawler w/crane boom, less shovel front.
Price, f.o.b. railroad tracks in northern Virginia $30,000.00

Lutherville Supply & Equipment Co.
Front and Lincoln Avenue
Lutherville, Maryland

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Jaeger — 5 Yd. Mixer, open end; on IH LF190 Tandem.
Rex — 3½ Yd. Mixer, Chrysler engine; mounted on I-H 174 Tandem. A Honey.
Challenge — 5 Yd. Mixer, open end, flush tank; mounted on Diamond "T" Tandem.

CRANES—HOES

Manitowoc — 1600 Used Lift—Dragline Crane, 50' Boom.
Insley — K-12 Used ½ Yd. Trench Hoe, Chrysler power.
Lorain — 15 Ton Truck Crane, 50' Boom, Jib, complete.
Schield Bantam — M-49 Used Lift Crane, 40' Boom, Ind. boom hoist; on GMC 6x6 Crane Carrier, outriggers.

MISCELLANEOUS

I-H — TD14 2 Yd. Hydraulic bucket.
Rogers — 20-Ton Tandem Low Boy, 6" drop deck, air brakes, swinging outriggers, rebuilt.

EIGHMY EQUIPMENT COMPANY
Pierpont at W. State St. WO 4-6706
ROCKFORD, ILLINOIS

TITANIUM PLANT

1—Traylor 11' x 155' Rotary Kiln, 2 tires, welded, 7/8" shell.
1—Rennenberg 6' x 60' Rotary Kiln.
2—Abbe 5' x 16' Ball Mills.
3—Bucket Elevators; 125', 32', 30'.
2—Aurora 24" Vert. Cent. Pumps, 200 HP motors, 5000 gpm, 125' head.
1—Bemis Automatic Bag Packer, Sewing Machine, Conveyor and Flattener.
1—Deep Well Pump, 75 HP Vert. Motor.
1—8' x 8' Oliver Precoat Filter.
6—Dorr Thickener Mechanisms, 16'.
18—Steel Buildings 20' to 80' wide, x 60' to 140' long.
2—20 ton Overhead Cranes, 30' & 35' spans.
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200'—Screw Conveyor, 8" and 12".

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Representative on Premises

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Market 3-7420

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2—American heavy duty, band type friction drag-scraper hoists, Cap. rear drum 5000# @ 600 RPM. Front drum 12,000#. Inhaul speed 250 FPM. Excellent condition.

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With 125 HP Elec. Motor — $6,500.00

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10" Electric Water Pump, 50 Horsepower Electric Motor, 200 Amp Fuse disconnect Switch. 125' #3-3 conductor type W Submarine Cable, current transformer and 400 amp switch, starter. Replacement cost $7000.00. Will take $3500.00.

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St. Louis 4, Mo.

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MANHEIM, W. VA.

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6—Vulcan 6'6"x60'x½" Rotary Kilns
2—Mosser 4'x47'x5/16" Rotary Dryers
1—Traylor 8'x11' Steel Lined Ball Mill
2—Beth. Fdy. 7'x24' Compeb Mills. three Compartment
2—Beth. Fdy. 5'x22' Tube Mills
3—Allis-Chalmers 6K; 8K Gyratorys
1—Non-clog 36"x50" Hammermill
10—Fuller Lehigh 42" Pulverizers
1—West. 750 KW Turbo Generator Set

STOCK ITEMS

5'x45' Standard Rotary Dryer
6'x25'; 6'x50' Louisville Rotary Dryers
7'x50'; 8'8"x70' Ruggles-Coles Dryers
15"x8" to 24"x18" Jeffrey Hammermills
2—Raymond 4 Roll High Side Mills
6—Tyler Hummer Screens 4'x8', 4'x6'
4—Robinson Saw Tooth Crushers
535'—24" Troughing Conveyor
Bucket Elevators 45' to 90' centers
BOILERS, COMPRESSORS, GENERATORS

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ROCK PROD. EQPT. DIV.

60 E. 42 St. **New York 17, N.Y.**
MU 7-5280

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For information contact Gouverneur Talc Co., Inc., Gouverneur, N. Y.

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2 cyl. Fairbanks Morse 120 SAE HP Diesel Style VA engine with air start equipment. Sharpening Machine, Ingersol Rand, mod. IR50, with dies for shanks and bits for drill steel. (2) 2 Drum Hoists with 50 HP D.C. motors. Quarry Channel Bar. 1000 ft. 4" pipe mass stl. air tanks.

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ROUTE 20 CHESTER, MASS.

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1 Garwood blade for Allis-Chalmers HD 20 tractor, power control Unit No. 281.

The Elm City Construction Co.

P.O. Box 4187 **Hamden 14, Conn.**

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CEDARAPIDS 3240 IMPACTOR PORTABLE w/14' apron feeder, vibrating grizzly, conveyor, 610 GM diesel, mounted factory tandem axles, pneumatic tires, dolly.

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Above Plants are 4 years old, just rebuilt by the factory and run 4 months. Excellent condition. Priced at $65,000 for the two, appr. 50% of new cost. Terms available.

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565 S. 10th Kansas City, Kansas
Mayfair 1-1710

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1½ Yd. Manitowoc #2000B Crane-Backhoe. New 1956.
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44 Ton Gen. Elec. Diesel Elec. Loco.
40/50 Ton American Diesel Loco. Crane
25 Ton Ind. BH. Diesel Loco. Crane
25 Ton Gen. Elec. Diesel Elec. Loco.
6 Yd. Bucyrus-Erie Elec. Shovel. 1955.
90 HP Lidgerwood 2D Diesel Hoist.

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CHestnut 1-4474

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Bethlehem Wire Rope: Muscle for Dragline Excavator. Here's a close look at one of the husky twin draglines, attached to a 33-cu-yd drag bucket, stripping overburden in western Pennsylvania. Bethlehem lang lay, IWRC, improved plow steel is used for the 2⅝-in. draglines, which are 285 ft long, and for the 2⅛-in. twin hoist lines, each 477 ft long.

Bethlehem Steel Company, Bethlehem, Pa. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem Wire Rope

BETHLEHEM STEEL

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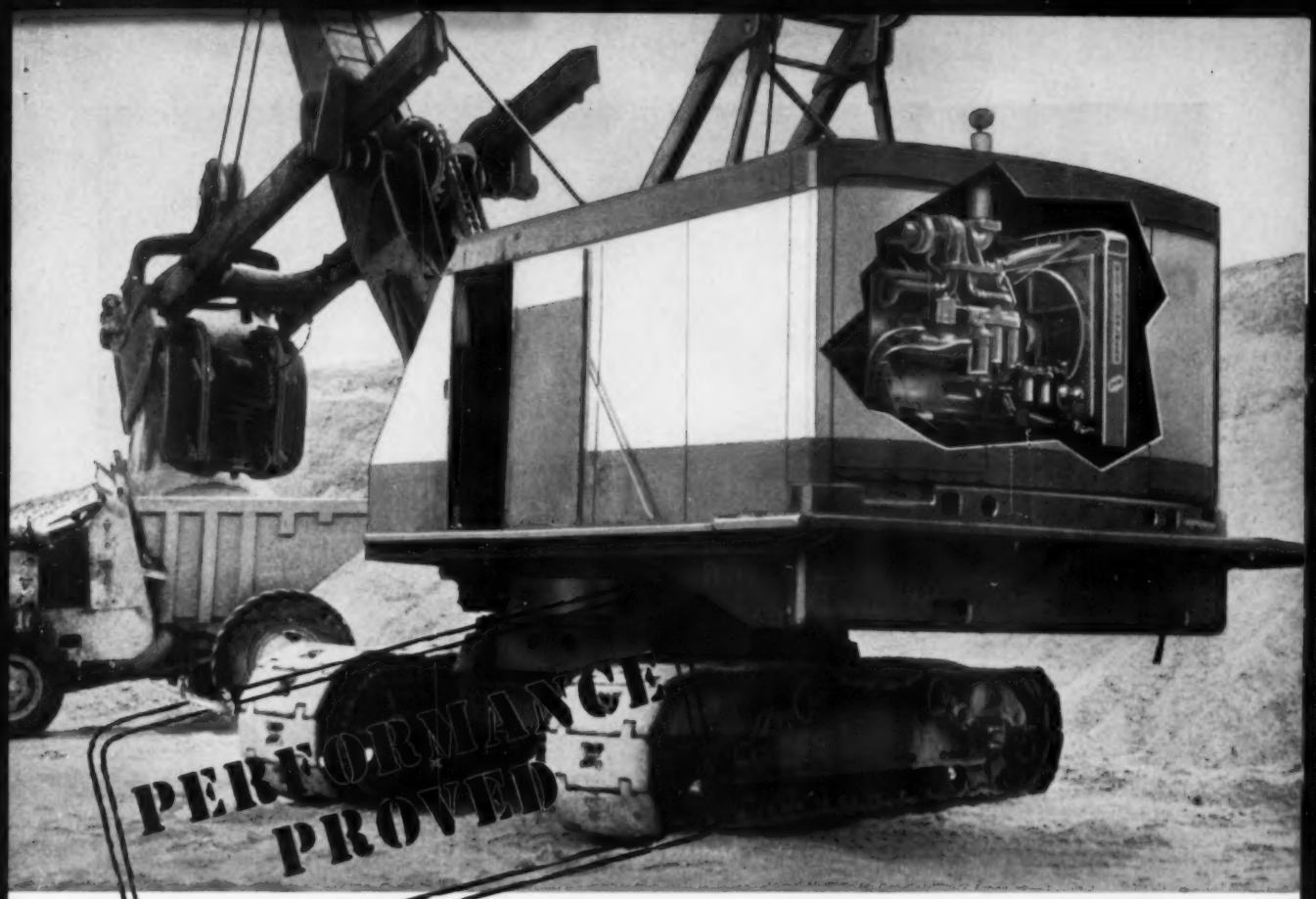

"We tried burying the bucket in the bank but couldn't... thanks to that 21000 diesel"

— That's a comment on performance of the Allis-Chalmers 21000 diesel repowering a 2½-yd shovel belonging to the Electro-Metallurgical Co., Ltd., Killarney State, Ontario.

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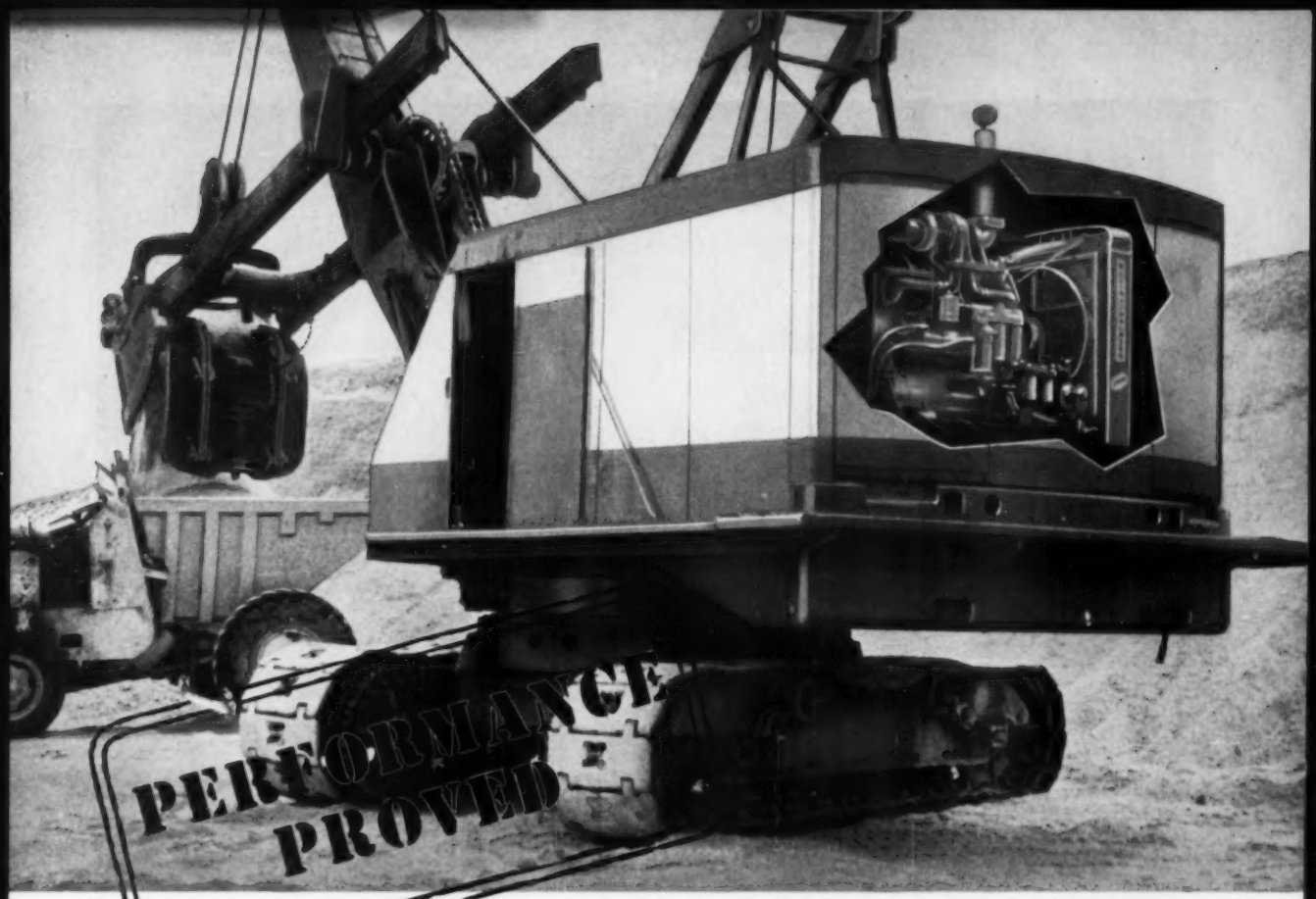

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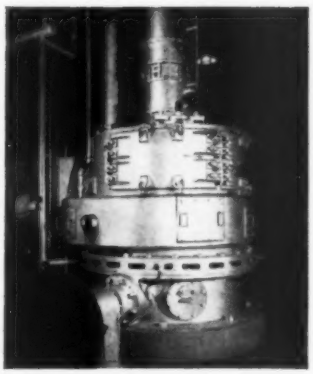

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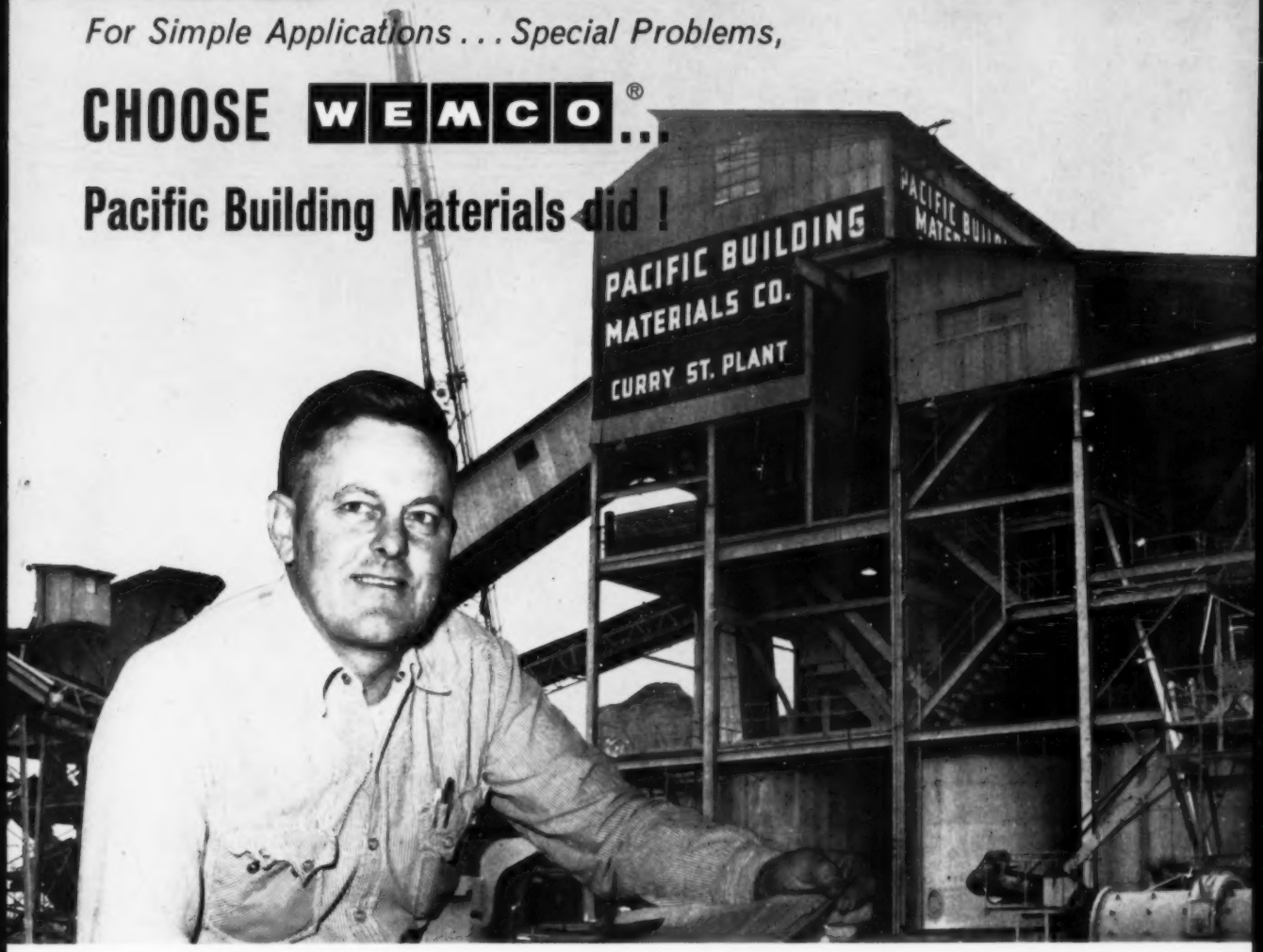

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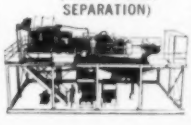

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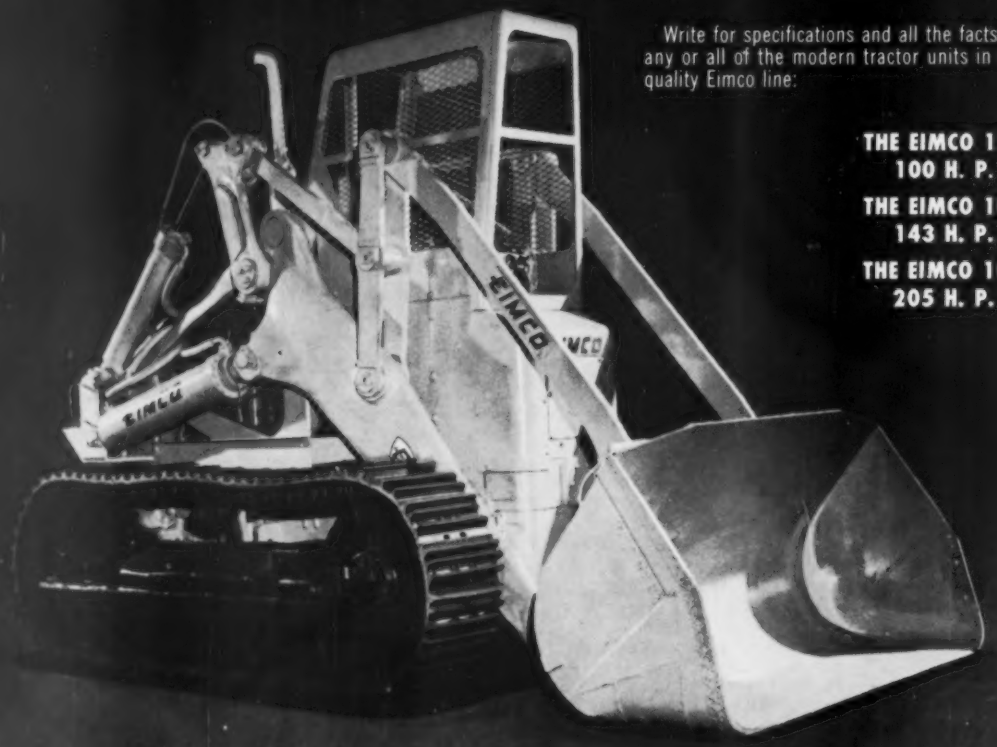

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